DCS & Labeling Worldwide

XL400e / XL410e Printers

OPERATOR MANUAL

PN 9001135A

SATO UK Limited
Valley Road, Harwich
Essex CO12 4RR

Tel: 01255 240000
Fax: 01255 240111

Tech Support Hotline: 01255 252828
Email: techsupport@satouk.com

www.satouk.com

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1

INTRODUCTION

- **About This Manual**
- **General Description**
- **Control Features**

ABOUT THIS MANUAL

This manual is laid out consistent with the product discussed and provides all of the information required for general printer configuration, operation, troubleshooting, and maintenance. For specialized programming, refer to the Programming Manual provided with the product.

Step-by-step maintenance instructions are provided with typical problems and solutions. Become familiar with each section before installing and maintaining the printer.

This manual also incorporates the use of special information boxes. Examples of these boxes and the type of information provided in each, are below.

WARNING: PROVIDES INFORMATION THAT, IF UNHEEDED, MAY RESULT IN PRESONAL INJURY.

CAUTION: PROVIDES INFORMATION THAT, IF UNHEEDED, MAY RESULT IN EQUIPMENT DAMAGE.

NOTE: Provides helpful hints to assist in performing the tasks at hand.

LCD DISPLAY: Provides the specific display that should be visible on the LCD at that point.

A comprehensive Table Of Contents provided at the front of this manual facilitates rapid movement within. The contents identify the different Units, Chapters, and Sections. Each references the page number of their commencement.

The pages of this manual have embedded headers and footers to assist the user in identifying his or her exact position within the manual. The header provides the unit number followed by its name. The footer identifies the product on the left, the manual's part number in the center, and the page number to the right side of the page.

Page enumeration is two-part with each separated by a hyphen. The first character set references the Unit and the second identifies the page number. Page numbers begin with the numeral (1) one at the commencement of a new unit and ascends sequentially.

GENERAL DESCRIPTION

The XL400/410 “e” series printers are complete, high-performance labeling systems designed specifically for printing labels and tags. All printer parameters are programmable using the front panel controls and dip switches to provide printing of all popular bar codes and fonts styles and sizes.

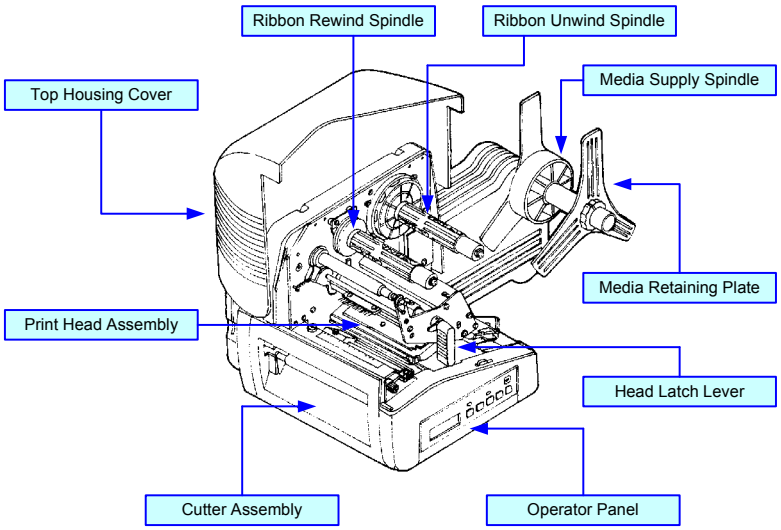


Figure 1-1a, Primary Components

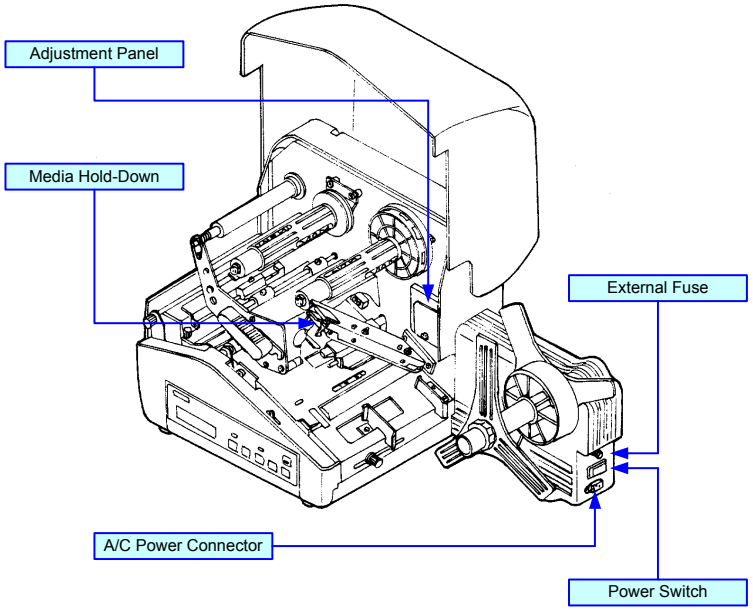


Figure 1-1b, Primary Components

CONTROL FEATURES

BUTTONS & SWITCHES	
POWER	Two position on/off switch that controls power flow to the system.
START / STOP	Toggles the printer on/off line.
FEED	Allows feeding of one tag or label each time it is pressed. Is only functional when the printer is off-line. Feeds one label when the cutter is disabled. Feeds one label, cuts, and backfeeds when the cutter is enabled.
CUTTER ON/OFF	Enables or disables the cutter. Is only functional when the printer is off-line.
EJECT	Feeds out any printed media. If the cutter is enabled; it feeds, cuts, and backfeeds. If cutter is disabled; it ejects, cuts, and backfeeds.
MEDIA TYPE	Allows the selection of the applicable media to be printed.
DSW1 & DSW2	Used to configure RS232 interface. Located behind access panel inside the printer.
DSW3	Is largely reserved. Located behind access panel inside the printer.

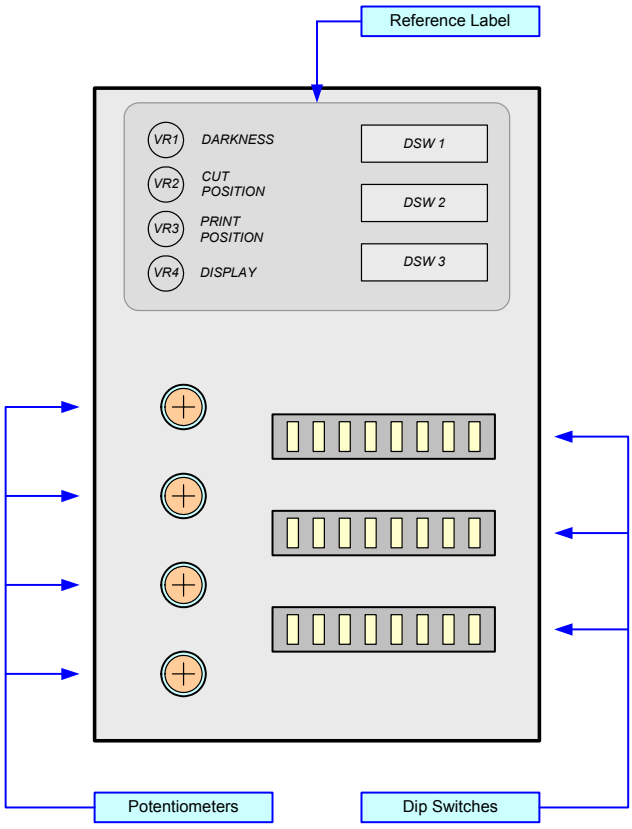


Figure 1-2a, Control Features

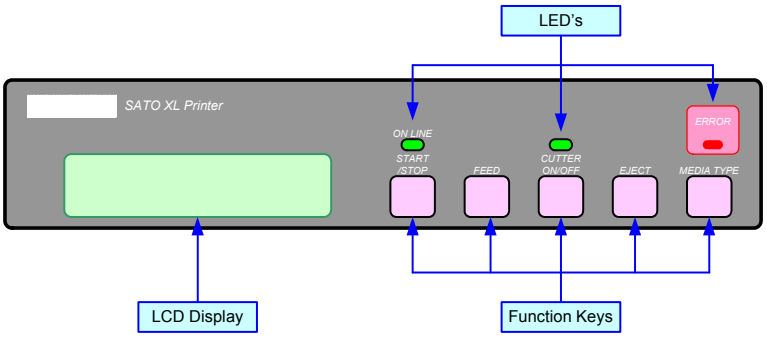


Figure 1-2b, Control Features

CONNECTION PORTS	
AC Power Input	Connector permits 115V, 50/60 Hz supply via supplied cord.
Interface Port	Connector for interface harness. Must be connected for the printer to be operational. Acceptable interface types are: • RS232C Serial I/F Module, DB-25 • Parallel • Universal Serial Bus Adapter • Ethernet 10/100 BaseT I/F Module • RS422/485 I/F Module, DB-9
Ext. Interface Port	Connector for external control of print cycle. Also supplies power for optional accessories - AMP 57-60140
Memory Card Slot	Slot for the insertion of optional PCMCIA Memory Card

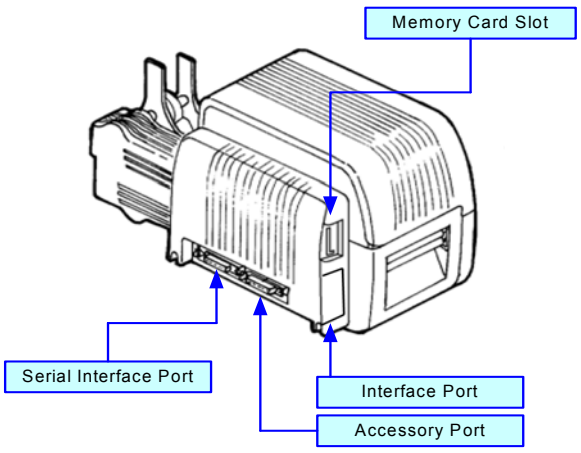


Figure 1-3, Connection Ports

2

TECHNICAL DATA

- **Physical Charcteristics**
- **Enviromental**
- **Power**
- **Processing**
- **Print**
- **Sensing**
- **Media**
- **Character Font Capabilities**
- **Barcode Capabilities**
- **Interface Modules**
- **Regulatory Approvals**

PHYSICAL CHARACTERISTICS	
Width	19.6 Inches (302 mm)
Height	11.50 Inches (294 mm)
Depth	11.80 Inches (552 mm)
Weight	30.80 Pounds (14.0 Kg) standard

ENVIRONMENTAL	
Operating Temperature	41° to 104°F (5° to 40°C)
Storage Temperature	0° to 104°F (-20° to 40°C)
Storage Humidity	Max 90% RH, Non-Condensing
Operating Humidity	15 to 85% RH, Non-Condensing
Electrostatic Discharge	8kV

POWER	
Input Voltage	115/220 Volts AC +/- 10%, 50/60 Hertz +/-1%
Power Consumption	150 Watts Operating

PROCESSING	
CPU	32 Bit RISC
FLash ROM	2 Mega-Bytes
SDRAM	16 Mega-Bytes
Receive Buffer	2.95 Mega-Bytes
Memory Expansion	See Options and Accessories

PRINT	
Method	Direct Thermal / Thermal Transfer
Speed (user selectable)	2, 3, 4, 5, 6 Inches Per Second
Print Module (dot size)	.0049 Inches (.125 mm)
Resolution	XL400e: 203 Dots Per Inch (8 dpmm) XL410e: 305 Dots Per Inch (12 dpmm)
Maximum Print Width	4.4 Inches (112 mm)
Maximum Print Length	14.0 Inches (355 mm)

SENSING	
Gap	Fixed
Reflective Eye-Mark	Fixed
Continuous Form	Sensor not used.

MEDIA	
Eye-Mark Label Dimensions	Width: 1.26 to 3.94 Inches (32-100mm) Length: 1.00 to 9.45 Inches (25-240mm)
Gap Label Dimensions	Width: 1.00 to 3.94 Inches (25-100mm) Length: 0.63 to 9.33 Inches (16-237mm)
Eye-Mark Tag	Width: 1.26 to 3.94 Inches (32-100mm) Length: 1.00 to 9.45 Inches (25-240mm)
Side Hole Tag	Width: 2.00 to 3.94 Inches (50-100mm) Length: 1.00 to 9.45 Inches (25-240mm)
Center Hole Tag	Width: 1.26 to 3.94 Inches (32-100mm) Length: 1.00 to 9.45 Inches (25-240mm)
R-Corner Tag	Width: 1.26 to 3.94 Inches (32-100mm) Length: 1.00 to 9.45 Inches (25-240mm)
Maximum Caliper	.008 Inches (.21 mm)
Maximum Roll Diameter	6 Inches (152 mm), Wound face inward
Minimum Core Diameter	3 Inches (76 mm)

CHARACTER FONT CAPABILITIES	
MATRIX FONTS	
XCS Font	24 dots W x 24 dots H (Care Symbol)
XCL Font	36 dots W x 36 dots H (Care Symbol)
XU Font	5 dots W x 9 dots H (Helvetica)
XS Font	17 dots W x 17 dots H (Univers Condensed Bold)
XM Font	24 dots W x 24 dots H (Univers Condensed Bold)
OA Font (OCR-A)	XL400e: 15 dots W x 22 dots H XL410e: 22 dots W x 33 dots H
OB Font (OCR-B)	XL400e: 20 dots W x 24 dots H XL410e: 30 dots W x 36 dots H
AUTO SMOOTHING FONTS	
XB	48 dots W x 48 dots H (Univers Condensed Bold)
XL	48 dots W x 48 dots H (Sans Serif)
VECTOR FONT	
	Proportional or Fixed Spacing Font Size 50 x 50 dots to 999 x 999 dots,10 Font Variations
DOWNLOADABLE FONTS	
	True Type Fonts with Optional Memory Upgrade
CHARACTER CONTROL	
	Expansion up to 12 x in either the X or Y coordinates. Charcter Pitch & Line Space Control, Journal Print facility 0, 90, 180, and 270 Degree Rotation

BAR CODE CAPABILTIES	
Linear Bar Codes	Bookland (UPC/EAN Supplemental EAN-8, EAN-13 CODABAR Code 39 Code 128 Interleaved 2 of 5 UCC/EAN-128 UPC-A and UPC-E
Two Dimemsional	Data Matrix Maxicode PDF417
Ratios	1:2, 1:3, 2:5, User definable bar widths
Bar Height	4 to 600 dots, User progammable
Rotation	0, 90, 180, and 270 Degrees
Sequential Numbering	Sequential numbering of both numerics and bar codes
Custom Characters	RAM storage for special characters
Graphics	Full dot addressable graphics, SATO Hex/Binary, PCX formats
Form Overlay	Form overlay for high-speed editing of complex formats

INTERFACE MODULES	
Parallel Port	IEEE 1284 Standard
Serial Port	RS232C (9,600 to 19,200 dps) Standard RS422/485 (9,600 to 57,600 bps) Optional
Universal Serial Bus	USB Adapter
Ethernet	802.11B Wireless
Data Transmission	ASCII Format

REGULATORY APPROVALS	
Safety	UL, CSA
RFI / EMI	FCC Class A

3

INSTALLATION

- **Unpacking**
- **Parts Identification**
- **Printer Installation**
- **Interface Selection**
- **Accessories Installation**

UNPACKING & PARTS IDENTIFICATION

Place the shipping container upright on a solid, flat surface. Open the container and remove the carboard cover and top foam inserts. Carefully lift the printer from the shipping container, followed by the acccessory box, and place them on a solid flat surface. Remove the plastic wrap from the printer and its accessories. Inspect the printer and its accessories for visual physical damage and ensure all components are present and report damaged property. Retain the shipping container, foam inserts, and plastic wrap in case future return is necessary.

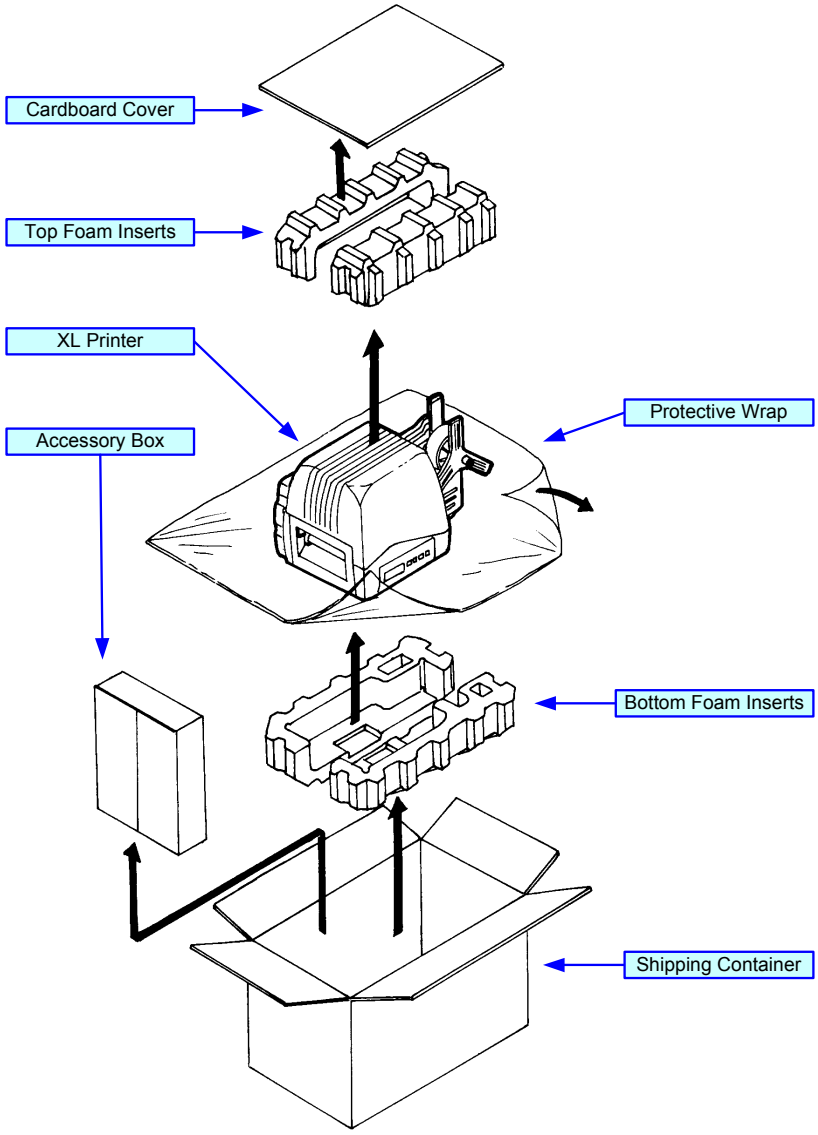


Figure 3-1, Unpacking and Parts Identification

PRINTER INSTALLATION

This chapter provides guidance on general printer setup and installation. The following chapter provides instructions on how to select an interface for the host to communicate with the printer.

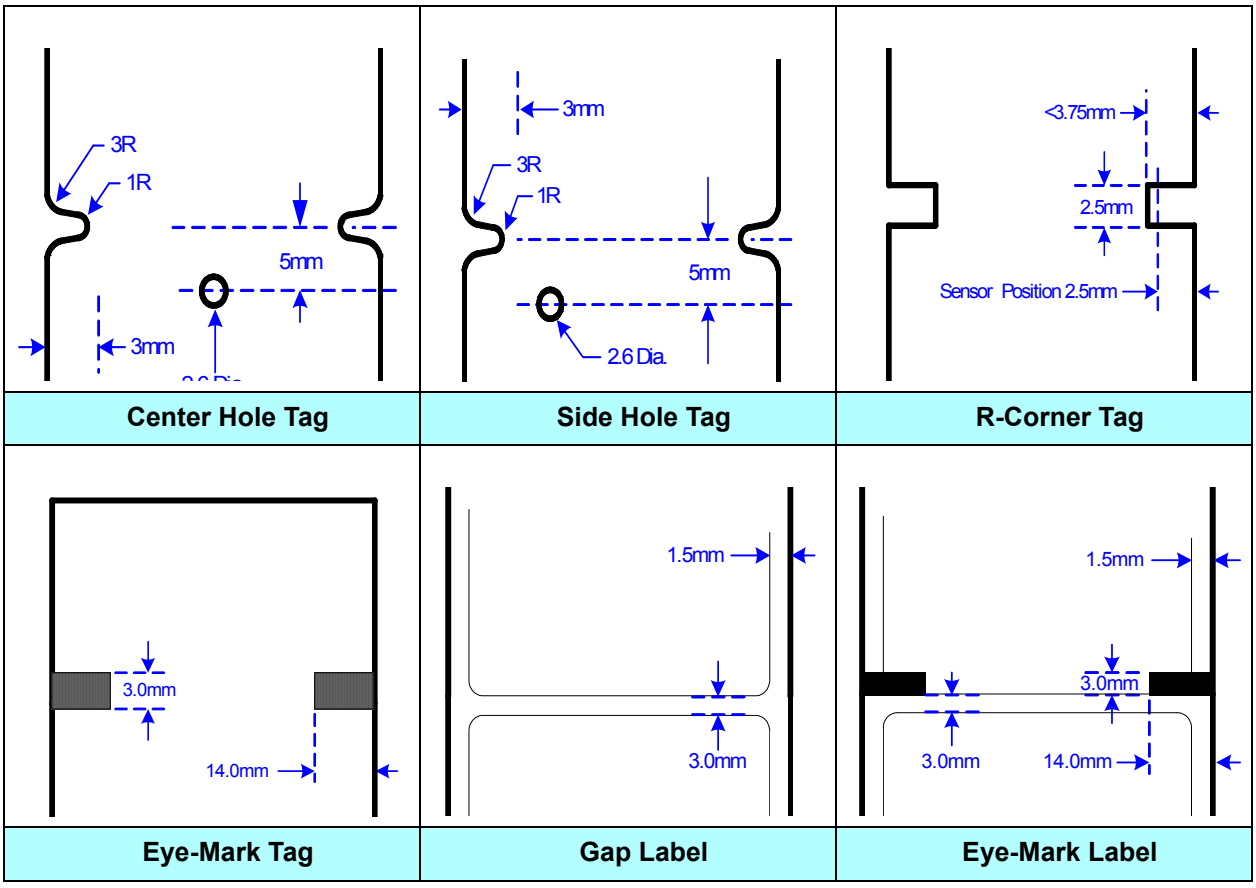
SITE LOCATION

- Stationed on a solid flat surface
- Stationed away from hazardous conditions
- Sufficient access space on all sides to premit access and opening of its covers.
- Stationed within operational distance of the host computer.

MEDIA SELECTION

The size and type of the labels or tags to be printed should have been taken into consideration before printer purchase. Ideally, the media width will be equal to, or just narrower than, the print head. Using media that does not cover the print head, will allow the platen roller to tread on the head and cause premature wear. The edge of the media will also wear a groove in the platen roller which will effect print quality.

After determining the width and length of the label or tag to be printed, and knowing the print head width, order the media width of the print head and with the labels or tags oriented so that the media's space is optimized. The media should be wound with its print surface inward.



Center Hole Tag	Side Hole Tag	R-Corner Tag
Eye-Mark Tag	**Gap Label**	**Eye-Mark Label**

MEDIA LOADING

Perform the following steps to load media into the printer. This procedure covers only the physical installation of media and is applicable regardless of the media type. Refer to the Configuration unit for setup instructions.

1 Switch the printer power switch off and disconnect the power supply cord (**Figure 3-3a**).

2 Open the top housing cover.

3 Remove the media retaining plate from media supply spindle (**Figure 3-3b**).

4 Insert media onto the media supply spindle followed by the media retaining plate.

5 Release print head latch and hinged media hold-down (**Figure 3-3c**).

6 Feed the media up the media ramp to its respective position (**Figure 3-3d**).

> NOTE: Feed label media onto the platen roller. Tag media is to be fed onto the feed roller.

7 Loosen set screw and manually adjust paper guide inward until media is denied lateral movement. Retighten set screw.

8 Lower and latch media hold-down, print head assembly, and top cover (**Figure 3-3e**).

9 Restore power and test print label (**Figure 3-3f**).

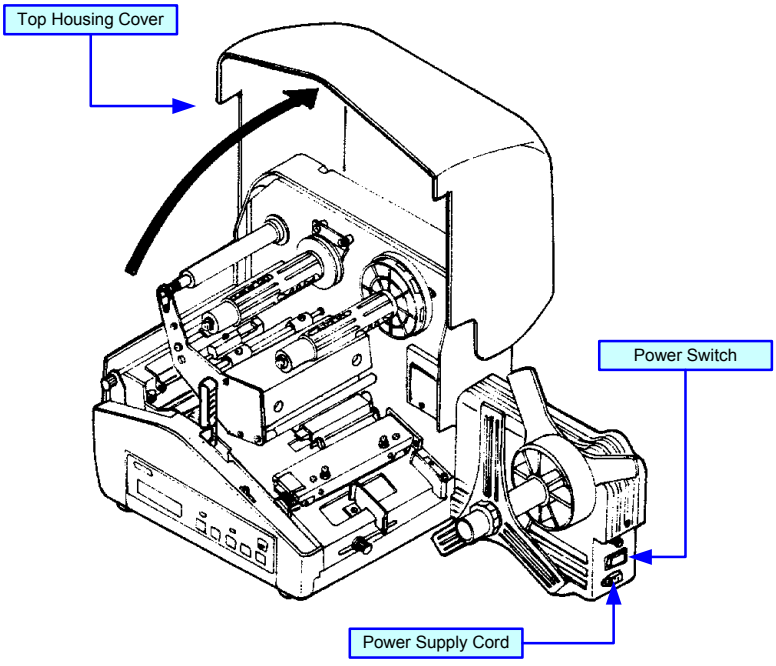


Figure 3-3a, Media Loading

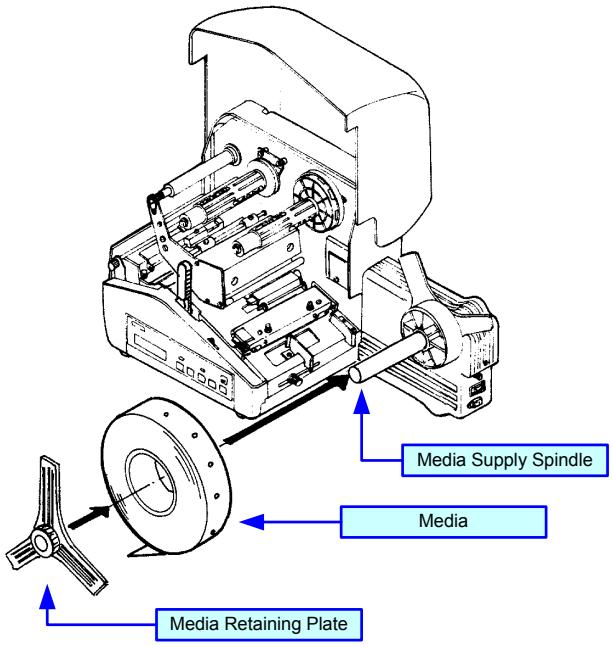


Figure 3-3b, Media Loading

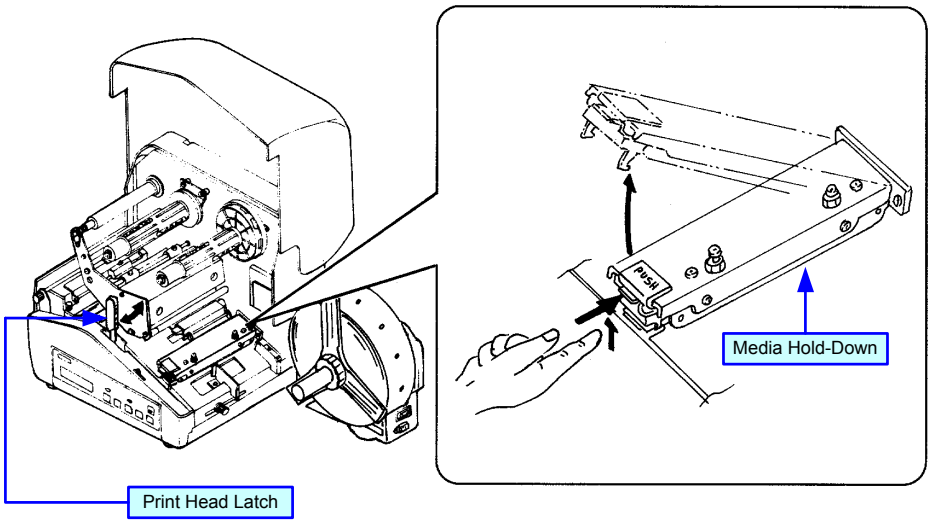


Figure 3-3c, Media Loading

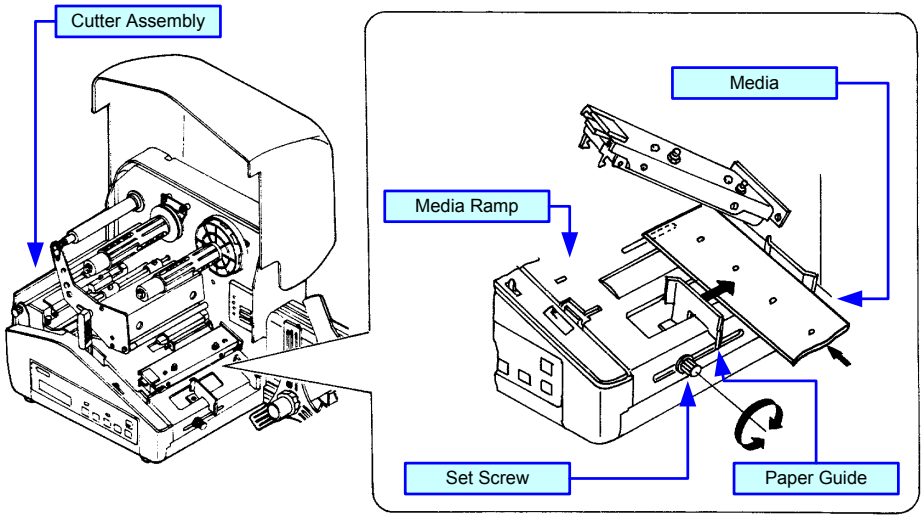


Figure 3-3d, Media Loading

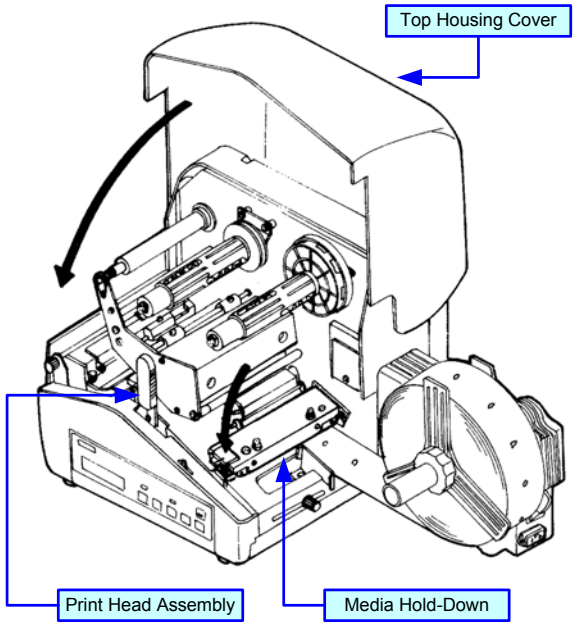


Figure 3-3e, Media Loading

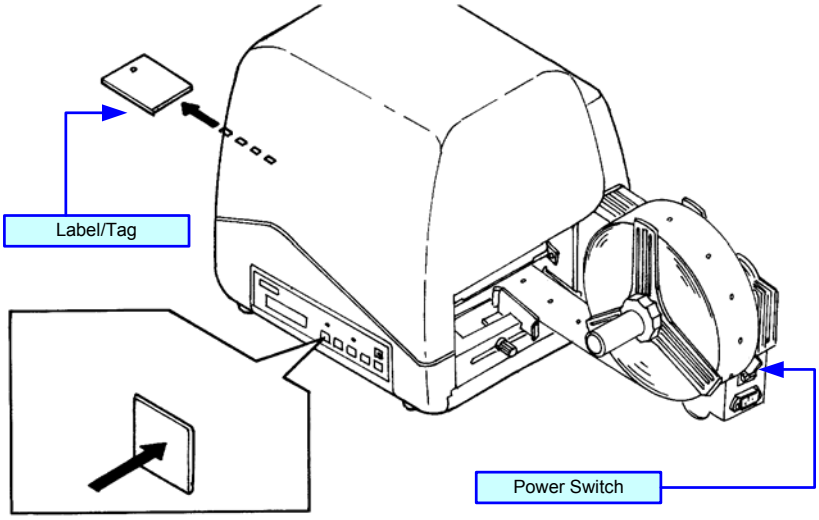


Figure 3-3f, Media Loading

RIBBON LOADING

Perform the following steps to load the printer with ribbon. This procedure covers only the physical installation of ribbon. Refer to the Configuration unit for setup instructions.

1 Switch the printer power switch off and disconnect the power supply cord (**Figure 3-4a**).
2 Open the top housing cover.
3 Release the print head latch (**Figure 3-4b**).
4 Insert ribbon roll onto the ribbon unwind spindle to unwind counter-clockwise (**Figure 3-4c**).
5 Insert a ribbon core onto the ribbon rewind spindle.
6 Route the free end of the ribbon around the print assembly (**Figure 3-4d**).
7 Tape the free end of the ribbon to the ribbon core (**Figure 3-4e**).
8 Rotate the ribbon rewind spindle clockwise until several layers of ribbon are on the core.
9 Lower the print head latch sandwiching the media and ribbon together (**Figure 3-4f**).
10 Close top housing cover.
11 Restore power and test print label (**Figure 3-4g**).

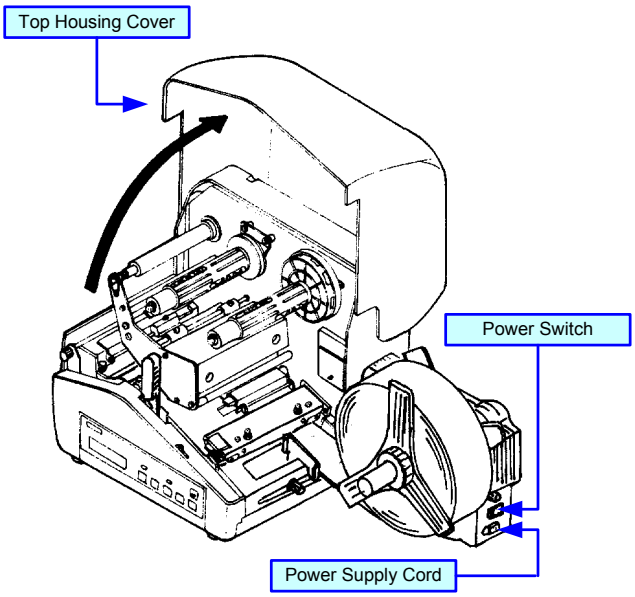


Figure 3-4a, Ribbon Loading

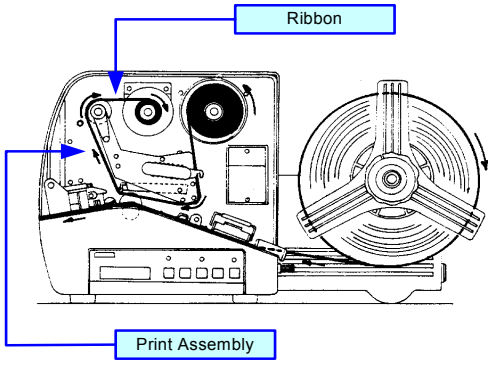


Figure 3-4b, Ribbon Loading

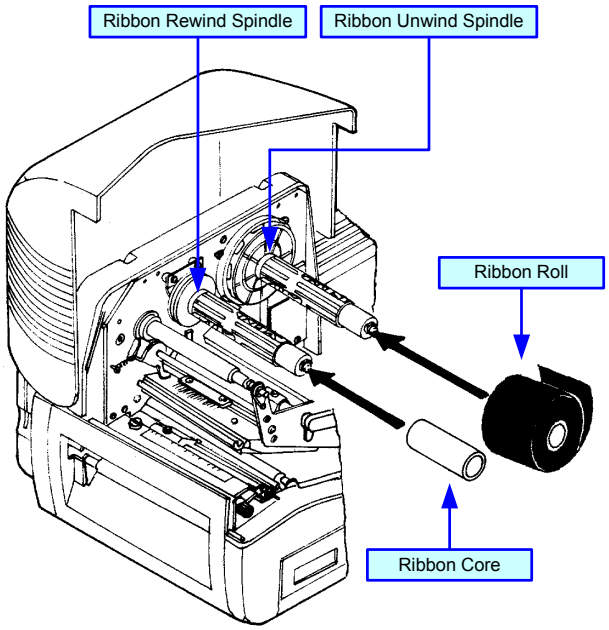


Figure 3-4c, Ribbon Loading

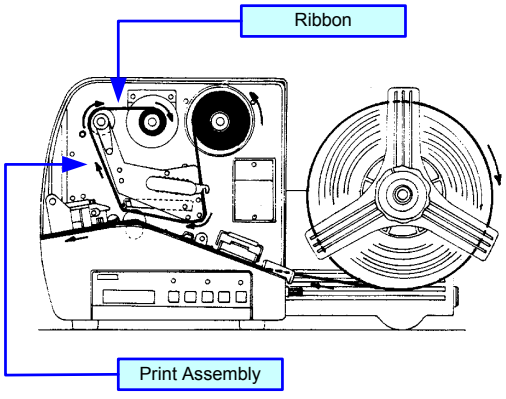


Figure 3-4d, Ribbon Loading

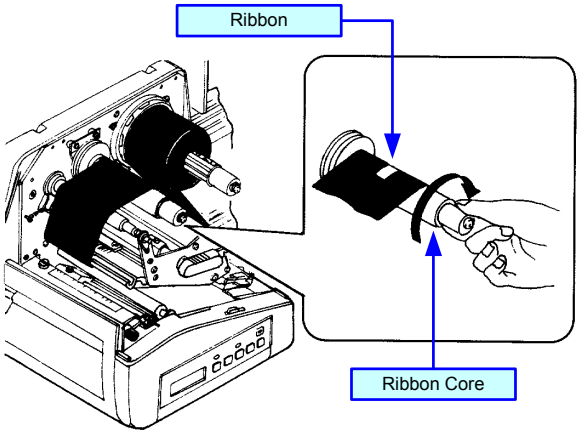


Figure 3-4e, Ribbon Loading

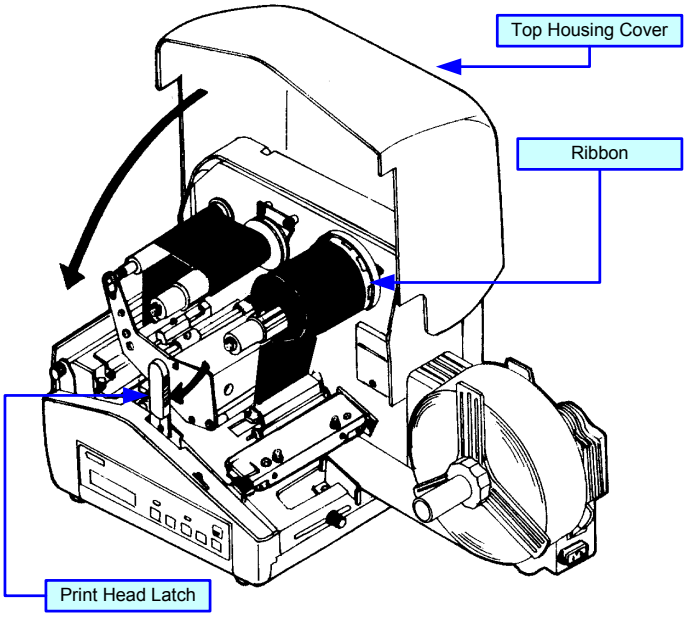


Figure 3-4f, Ribbon Loading

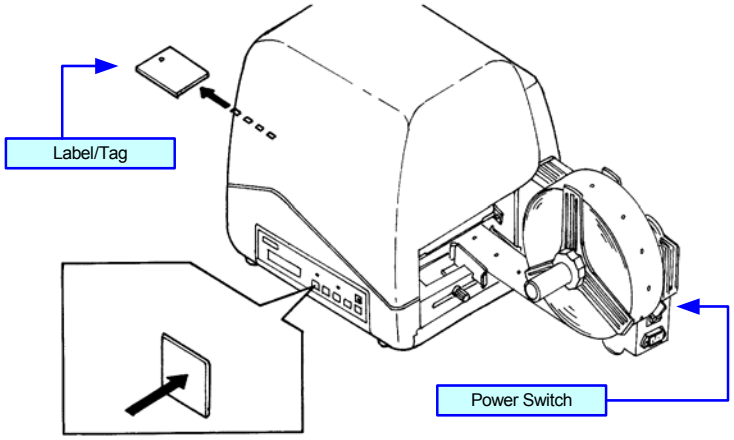


Figure 3-4g, Ribbon Loading

INTERFACE SELECTION

This chapter presents the printer interface types and their specifications. These specifications include detailed information to assist in the selection of the most appropriate method for the printer to interface with the host. The four acceptable interface methods are:

- RS232C Asynchronous Serial
- IEEE1284 Parallel
- Universal Serial Bus (USB) Adapter
- Local Area network (LAN) Ethernet
- 802.11B Wireless

Following the selection of the desired interface, proceed to the next unit for instructions on how to Configure the printer for that interface type.

WARNING: NEVER CONNECT OR DISCONNECT INTERFACE CABLES (OR USE A SWITCH BOX) WITH POWER APPLIED TO EITHER THE HOST OR THE PRINTER. THIS MAY CAUSE DAMAGE TO THE INTERFACE CIRCUITRY IN THE PRINTER/HOST AND IS NOT COVERED BY WARRANTY.

NOTE: Some hosts monitor the Request-To-Send (RTS) signal (pin 4 of 25) to determine if the printer is ready to receive data. Since the printer does not generate this signal, the RTS line must be held true (high) in order to allow communication. This can be performed by connecting the RTS pin to the Clear-To-Send (CTS) signal (pin 5 of 25).

RS232 SERIAL INTERFACE

This High Speed Serial Interface is a Plug-In Interface Module that can be installed in the printer by the user. The only difference between this interface and the TTL is their signal levels and cable pinouts.

RS232C SPECIFICATIONS	
Asynchronous ASCII	Half-duplex communication Bi-Directional Communication
Data Transmission Rate	9600, 19200, 38400, 57600 bps
Data Length	8 bit (selectable)
Stop Bit	1 bit (fixed)
Parity Bit	ODD, EVEN, NONE (selectable)
Codes Used	ASC II Character Codes, JIS Kanji Codes
Control Codes	STX (02H), ETX (03H), ACK (06H), NAK (15H)
Connector	Special
Cable	Special
Signal Levels	High = +5V to +12V, Low = -5V to -12V

RS232C SERIAL INTERFACE SIGNALS		
PIN	**DIRECTION**	**SIGNAL DEFINITION**
1	Reference	FG (Frame Ground)
2	To Host	TD (Transmit Data) - Data from the printer to the host computer. Sends X-On/ X-Off characters or status data (bi-directional protocols).
3	To Printer	RD (Receive Data) - Data to the printer from the host computer.
4	To Host	RTS (Request to Send) - Used with Ready/Busy flow control to indicate an error condition. RTS is high and remains high unless the print head is open (in this case, RTS would return to the high state after the print head is closed and the printer is placed back on-line) or an error condition occurs during printing (e.g., ribbon out, label out).
5	To Printer	CTS (Clear to Send) - When this line is high, the printer assumes that data is ready to be transmitted. The printer will not receive data when this line is low. If this line is not being used, it should be tied high (to pin 4).
6	To Printer	DSR (Data Set Ready) - When this line is high, the printer will be ready to receive data. This line must be high before data is transmitted. If this line is not being used, it should be tied high (to pin 20).
7	Reference	SG (Signal Ground)
20	To Host	DTR (Data Terminally Ready) - This signal applies to Ready/Busy flow control. The printer is ready to receive data when this pin is high. It goes low when the printer is off-line, either manually or due to an error condition, and while printing in the single job buffer mode. It will also go low when the data in the buffer reaches the buffer near full level.

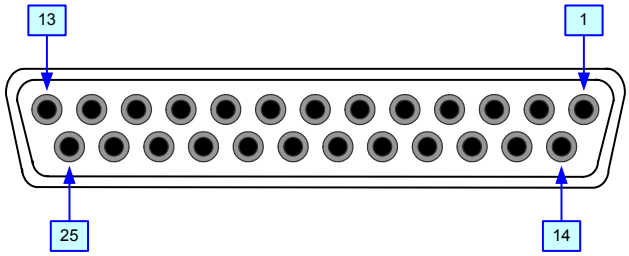


Figure 3-5, Serial Connector Pin Asignments

CABLE REQUIREMENTS					
DB9	**DB25**	**HOST**	**CONNECTION**	**DB9**	**PRINTER**
1	1	FG (Frame Ground)	Bi-Directional	1	FG (Frame Ground)
2	3	RD (Receive Data)	To Host	2	TD (Transmit Data)
3	2	TD Transmit Data)	To Printer	3	RD (Receive Data)
8	5	CTS (Clear To Send)	To Printer DB9-6	4	RTS (Request to Send)
4	20	DTR (Data Terminal Ready)	To Printer DB9-4	6	DSR (Data Set Ready)
6	6	DSR* (Data Set Ready)	To Host	9	DTR (Data Terminal Ready)
5	7	SG (Signal Ground)	Bi-Directional	7	SG (Signal Ground)
** This connection at the host side of the interface would depend upon the pin that is being used as the Ready/Busy signal by the driving software. Typically, on a PC, it would be either CTS (pin5) or DSR (pin 6) on a DB-25 connector.*					

IEEE1284 PARALLEL INTERFACE

The parallel interface is a Plug-In, bi-directional, Interface Module that can be installed by the user. It conforms to the IEEE1284 specification. It will automatically detect the IEEE1284 signals and operate in the high speed mode. If it does not detect the IEEE1284 signals, it will operate in the standard Centronics mode, which is significantly slower. For this reason, an interface cable and host interface conforming to the IEEE1284 specification must be present to fully utilize the speed capabilities.

SPECIFICATIONS	
Printer Connector	AMP 57-40360 DDK (or equivalent)
Cable Connector	AMP 57-30360 DDK (or equivalent)
Cable	IEEE1284 Parallel, 10 ft. (3 m) or less
Signal Level	High = +2.4V to +5.0V, Low = 0V to -0.4V
Data Stream	<ESC>A . . Job#1 . . <ESC>Z<ESC>A . . Job#n . . <ESC>Z

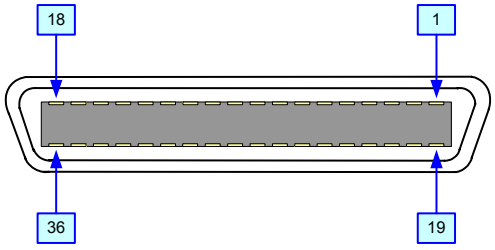


Figure 3-6, Parallel Connector Pin Asignments

IEEE 1284 PARALLEL INTERFACE PIN ASSIGNMENTS					
PIN	**SIGNAL**	**DIRECTION**	**PIN**	**SIGNAL**	**DIRECTION**
1	Strobe	To Printer	19	Strobe Return	Reference
2	Data 1	To Printer	20	Data 1 Return	Reference
3	Data 2	To Printer	21	Data 2 Return	Reference
4	Data 3	To Printer	22	Data 3 Return	Reference
5	Data 4	To Printer	23	Data 4 Return	Reference
6	Data 5	To Printer	24	Data 5 Return	Reference
7	Data 6	To Printer	25	Data 6 Return	Reference
8	Data 7	To Printer	26	Data 7 Return	Reference
9	Data 8	To Printer	27	Data 8 Return	Reference
10	ACK	To Host	28	ACK Return	Reference
11	Busy	To Host	29	Busy Return	Reference
12	Ptr Error	To Host	30	PE Return	Reference
13	Select	To Host	31	INIT	From Host
14	AutoFD[1]	To Host	32	Fault	To Host
15	Not Used		33	Not Used	
16	Logic Gnd		34	Not Used	
17	FG	Frame Gnd	35	Not Used	
18	+5V (z=24k ohm)	To Host	36	SelectIn[1]	From Host
1 *Signals required for ieee 1284 mode.*					

UNIVERSAL SERIAL BUS (USB) ADAPTER

The Universal Serial Bus (USB) interface is a Plug-In Interface Module that can be installed by the user. It requires a driver (shipped with each printer that has the interface installed) that must be loaded on your PC and the PC must be configured to support USB peripherals using Windows 98 or above. Details for loading the USB driver are contained in the USB Interface Manual that is shipped with each printer with a USB Optional interface installed. Up to 127 devices may be connected to a USB port using powered hubs.

SPECIFICATIONS	
Printer Connector	USB Type B Plug
Cable	10 feet (3 m) maximum
Host	Windows 98 or above with USB Port
Power Supply	BUS Power through cable
Power Consumption	+5 V at 80 ma

LOCAL AREA NETWORK (LAN) ETHERNET

A Local Area Network (LAN) interface is an optional Plug-In Interface Module that can be installed by the user. It requires a driver shipped with each printer that has the interface installed. The driver that must be loaded on your PC and the PC must be configured to run one of the supported network protocols using a 10/100BaseT LAN connection. Details for loading the LAN driver are contained in the LAN Interface Manual that is shipped with each printer with a LAN Optional interface installed.

SPECIFICATIONS	
Connector	RJ-45 Receptacle
Cable	10/100BaseT Category 5
Power Supply	Powered from printer

802.11B WIRELESS

The wireless print server provides easy printer interface with 802.11b Wi-Fi compliant networks free of wired connections. Each printer is shipped with an integrated driver and interface installed. The driver must be loaded on your PC and the PC must be configured to run one of the supported protocols.

80211B WIRELESS SPECIFICATIONS	
Variable Data Rates	11, 5.5, 2 and 1 Mbps
Frequency Band	2.4 GHz ISM Band
Wired Equivalent Privacy	128 bit, 64 bit (compatible with 40bit), none
Sensitivity	(typ, AAWGN, 8E-2 PER): -91dBm at 1Mbps, -88dBm at 2 Mdps, -87dBm at 5.5Mbps, -84dBm at 11Mbps.
Range	100m indoors, 300m outdoors
Protocols	TCP/IP, IPX/SPX, Direct Mode IPX/IP, DLC/LLC, NetBEUI, NetBIOS/IP

RECEIVE BUFFER

The data stream is received from the host to the printer one job at a time. This allows the software program to maintain control of the job print queue so that it can move a high priority job in front of ones of lesser importance.

A multiple job buffer allows the printer to continuously receive print jobs while compiling and printing other jobs at the same time. It acts much like a Print buffer to maximize the performance of the host and the printer.

The printer receives and prints one job at a time. If a print job exceeds the buffer size, transmission will be rejected by the printer. Flow control protocols to throttle transmission are not used. Error conditions that occur during the Print Data transmission will cause the printer to return a NAK.

ACK/NAK PROTOCOL

Bi-Directional ACK/NAK protocol is used for error control. In a normal transmission sequence when the transmission is received, the printer will return an ACK (06H) signifying that it was received without a transmission error. After the transmission command structure has been analyzed, a status byte is returned to the host. This status byte informs the host of the validity of the command structure.

If the command structure is error free, the printer proceeds with the print operation. When the print operation is completed, a Printer Status message is returned to the host. If an error was detected during the initial transmission sequence, a NAK (15H) will be returned signalling to the host that the received transmission contained errors and must be resent. If the returned Status byte indicates a command structure error, the error must then be corrected before the print data is resent to the printer.

A valid transmission to the printer must be bounded by an STX/ETX pair, with the STX (02H) signifying the start of the Print Data and ending with an ETX (03H) signifying the end.

ACCESSORIES INSTALLATION

In most instances, the printer is ordered with the desired accessories pre-installed. However, changes in printing conditions or requirements does warrant upgrades from time to time.

This chapter of the manual covers the installation procedures of accessories that are deemed suitable for the owner/operator to perform. For all other accessory upgrades or installatins, contact the SATO Technical Support Dept.

PCMCIA MEMORY UPGRADE

The memory card upgrade allows printer memory to be expanded from 2MB to 4MB. The card may be installed by simply removing the access cover from the face of the printer and inserting the card into the exposed slot.

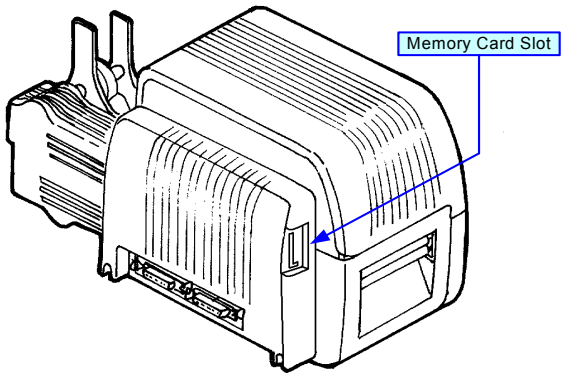


Figure 3-7, Memory Upgrade

STACKER UNIT

The XL Stacker Unit collects and stacks tags as they are printed and cut. Installation of the included alignment plate ensures proper spacing and alignment of the stacker with the printer. Connecting the stacker's power cord to the Option port of the printer concludes installation. Adjust the unit for operation in accordance with the instructions provided with the product.

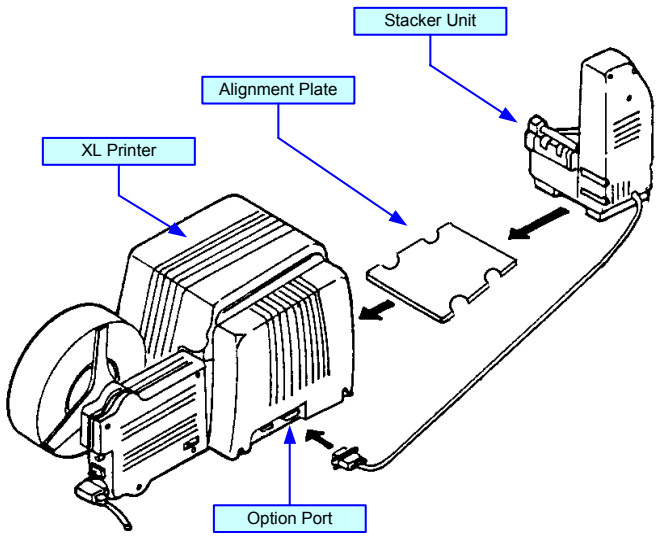


Figure 3-8, Label Stacker Installation

4

OPERATION

- **Printer Configuration**
- **Configuration Modes**
- **Operational Adjustments**
- **Printing**

PRINTER CONFIGURATION

The printer may be configured for specific jobs via the operator panel located on the right side of the printer and the interface panel comprised of three dip switch complexes and four potentiometers located within the printer's interior. Each of these must be adjusted for full printer configuration. The first step is to set the dip switches to their proper positions and then proceed to the Configuration Modes and Operational Adjustments chapters to complete process.

DIP SWITCH PANELS

The following tables provide guidance on the enabling/disabling of various printer functions and features. Determine what features are applicable to your setup, or desired setup, and adjust their respective dip switches as applicable.

Each dip switch panel is an eight switch complex. Each switch is of a two position on/off toggle type with the On position always oriented upward. To set the switches, first power the unit off, then position the dip switches as required. After placing the dip switches in the desired positions, power the printer back on. The switch settings are read by the printer electronics during the power up sequence. They will not become effective until the power is cycled.

NOTE: There are three dip switch complexes and each are numbered respectively. Each dip switch complex has eight switches that are also numbered. Each of the following three tables represents a single dip switch complex. The left column of each table identifies the switch number and every column following that, provides settings information.

CAUTION: NOT ALL OF THE SWITCHES WILL REQUIRE ADJUSTMENT, CHANGE ONLY THOSE SWITCH SETTINGS THAT ARE NECESSARY. LEAVE ALL OTHERS AT THEIR DEFAULT POSITIONS.

DSW1 DEFAULT SETTINGS							
1-1	**1-2**	**1-3**	**1-4**	**1-5**	**1-6**	**1-7**	**1-8**
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

DSW1 CONFIGURATION				
1-1	Data BIt	OFF		8 Data Bit
		ON		7 Data Bit
1-2 1-3	Parity	1-2	1-3	
		ON	ON	Reserved
		ON	OFF	Odd
		OFF	ON	Even
		OFF	OFF	None
1-4	Stop Bit	OFF		1 Stop Bit
		ON		2 Stop Bit
1-5 1-6	Baud Rate	1-5	1-6	
		ON	ON	Normal: 2400, High Speed: 57600
		ON	OFF	Normal: 4800, High Speed: 38400
		OFF	ON	Normal: 19200, High Speed: 19200
		OFF	OFF	Normal: 9600, High Speed: 9600
1-7 1-8	Protocol	1-7	1-8	
		ON	ON	Status 4
		ON	OFF	Status 3
		OFF	ON	XOn / XOff
		OFF	OFF	Ready / Busy

DSW1 FUNCTION DESCRIPTIONS	
FUNCTION	**DESCRIPTION**
Data Bit	Sets the printer to receive either 7 or 8 bits of data for each byte transmitted.
Parity	Selects the type of parity used for error detection.
Stop Bit	Selects the number of stop bits to end each byte transmission.
Baud Rate	Select the data rate (bps) for the RS232 port.
Protocol	Selects the flow control and status reporting protocols.

DSW2 DEFAULT SETTINGS							
2-1	**2-2**	**2-3**	**2-4**	**2-5**	**2-6**	**2-7**	**2-8**
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

DSW2 CONFIGURATION			
DSW2	**FUNCTION**	**SETTING**	**CONFIGURATION**
2-1	Print Mode	OFF	Thermal Transfer
		ON	Direct Thermal
2-2	Reserved	OFF	N/A
		ON	N/A
2-3	Head Check	OFF	Head Check Disabled
		ON	Head Check Enabled
2-4	Hex Dump	OFF	Hex Dump Disabled.
		ON	Hex Dump Enabled
2-5	Receive Buffer	OFF	Single Job Receive Buffer
		ON	Multi-Job Receive Buffer
2-6	Firmware Download	OFF	Disabled
		ON	Enabled
2-7	Protocol Code	OFF	Standard Protocol Mode
		ON	Non-Standard Protocol Mode
2-8	Operational Mode	OFF	Standard Mode
		ON	Compatibility Mode

DSW2 FUNCTION DESCRIPTIONS	
FUNCTION	**DESCRIPTION**
Print Mode	Print with the use of ribbon or without.
Head Check	When enabled, will check for malfunctioning head elements.
Hex Dump	Allows hexadecimal printing of all data received to the print buffer.
Receive Buffer	Allows to continuously receive print jobs while compiling and printing other jobs.
Firmware Download	Places printer in mode for downloading software into flash ROM.
Protocol Code	Selects the command codes used for protocol control.
Operational Mode	Standard mode or for original XL400/410.

DSW3 DEFAULT SETTINGS							
3-1	**3-2**	**3-3**	**3-4**	**3-5**	**3-6**	**3-7**	**3-8**
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

DSW3 CONFIGURATION			
DSW1	**FUNCTION**	**SETTING**	**CONFIGURATION**
3-1	N/A	OFF	Reserved
		ON	Reserved
3-2	Pitch Size Check	OFF	Disabled
		ON	Enabled
3-3	N/A	OFF	Reserved
		ON	Reserved
3-4	N/A	OFF	Reserved
		ON	Reserved
3-5	N/A	OFF	Reserved
		ON	Reserved
3-6	N/A	OFF	Reserved
		ON	Reserved
3-7	N/A	OFF	Reserved
		ON	Reserved
3-8	N/A	OFF	Reserved
		ON	Reserved

DSW3 FUNCTION DESCRIPTIONS	
FUNCTION	**DESCRIPTION**
Pitch Check	Checks the pitch size.

CONFIGURATION FOR LAN INTERFACE				
DSW2-8	**DSW2-5**	**PORT NUMBER**	**COM STATUS**	**DESCRIPTION**
ON	OFF	1 Port (1024: Bi-Directional)	Status 3	ENQ Response
	ON	N/A	N/A	Reserved
OFF	OFF	2 Port (1024: Data Port) (1025: Status Port)	Driver Protocol	Periodic Response
	ON		Driver Protocol	ENQ Response

CONFIGURATION MODES

With exception of the Power switch located on the back side of the printer, all of the following configuration activities are performed via the use of the operator panel located on the printer's right side and the adjustment panel located within the printer's interior.

Many settings may also be controlled via software commands. In the case of conflict between the software and control panel settings, the printer will always use the last entered valid setting.

NORMAL MODE

When a print job is received, the LCD will count off the label quantity as they are printed.

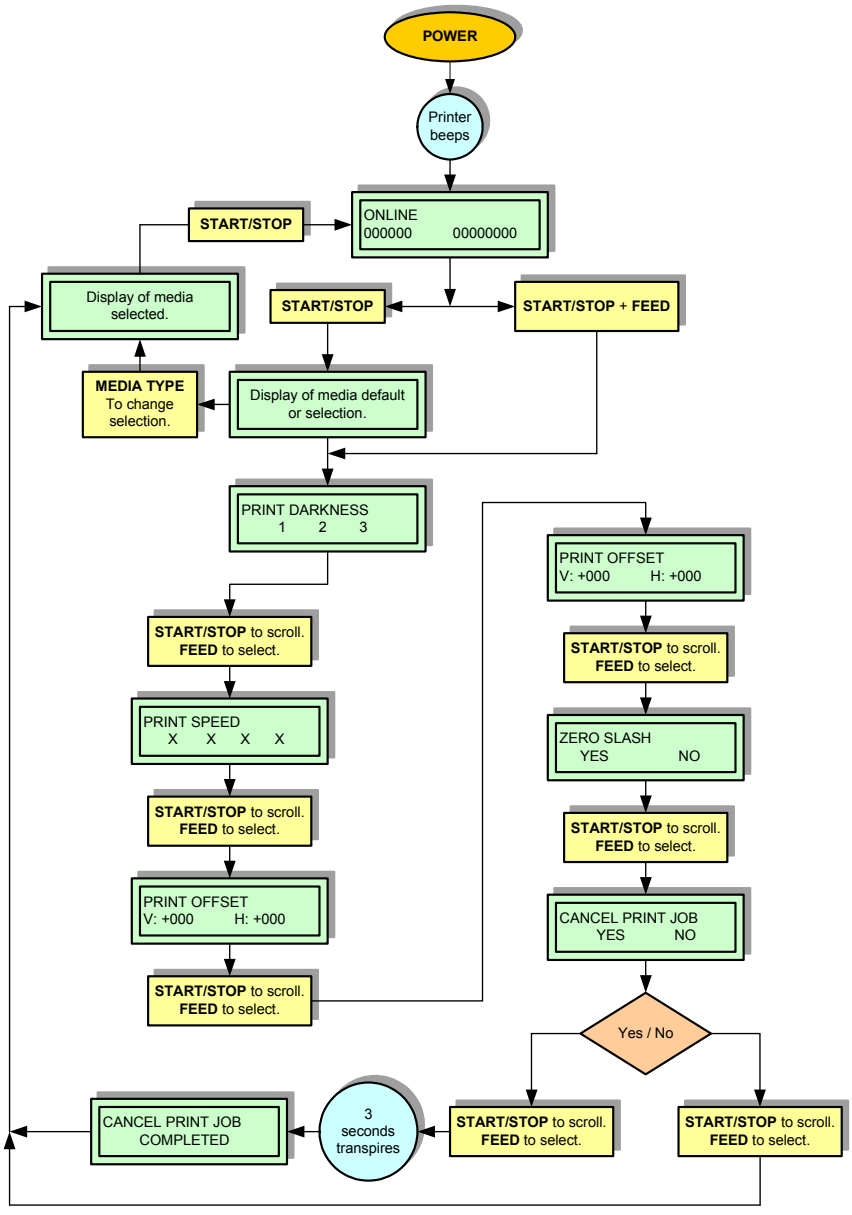


Figure 4-1, Normal Mode

TEST PRINT MODE

This mode allows the operator to print test labels for troubleshooting and for verification of configuration settings.

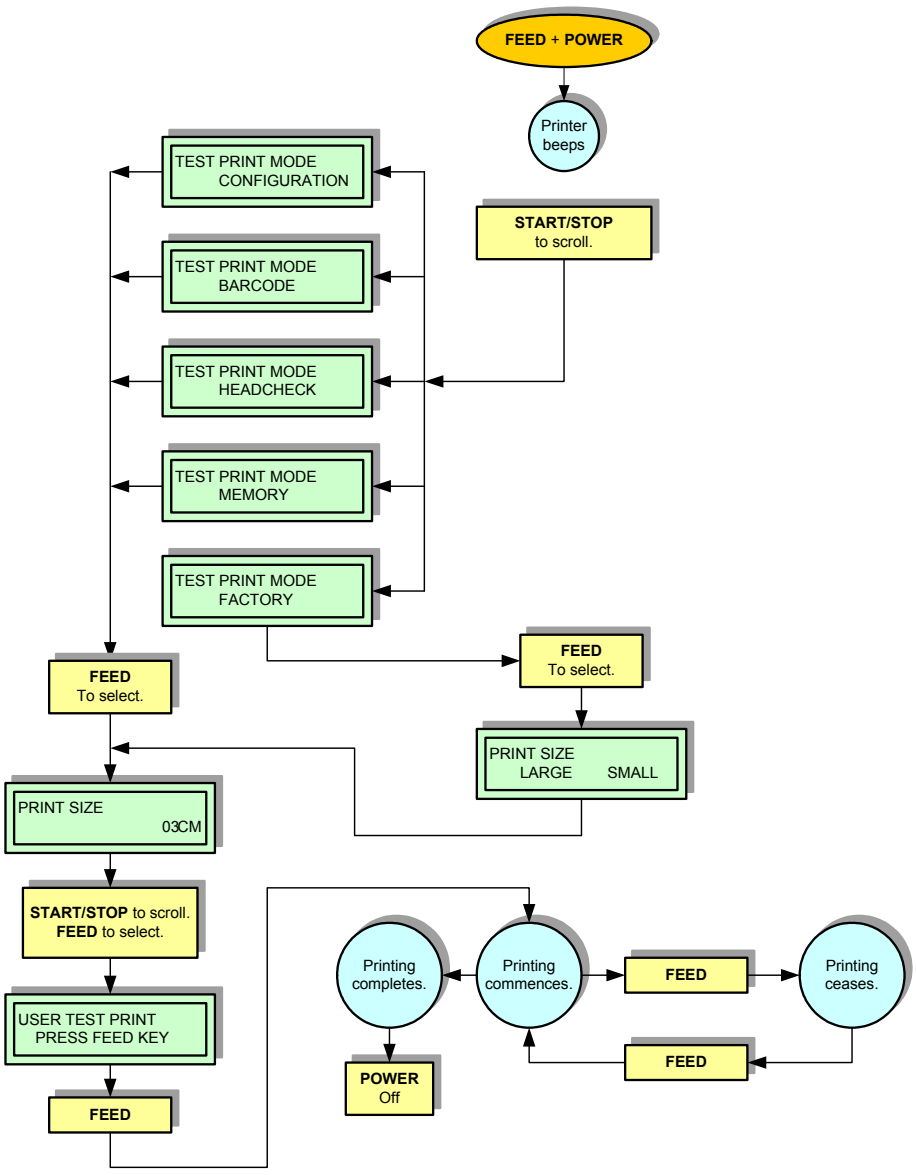


Figure 4-2, Test Print Mode

ADVANCED MODE

The Advanced Mode is provided to make basic printer operational adjustments. Typically, once these adjustments or settings have been made, they will not require additional address unless a new job is downloaded. The following table identifies the menus of the Advanced Mode and their purpose.

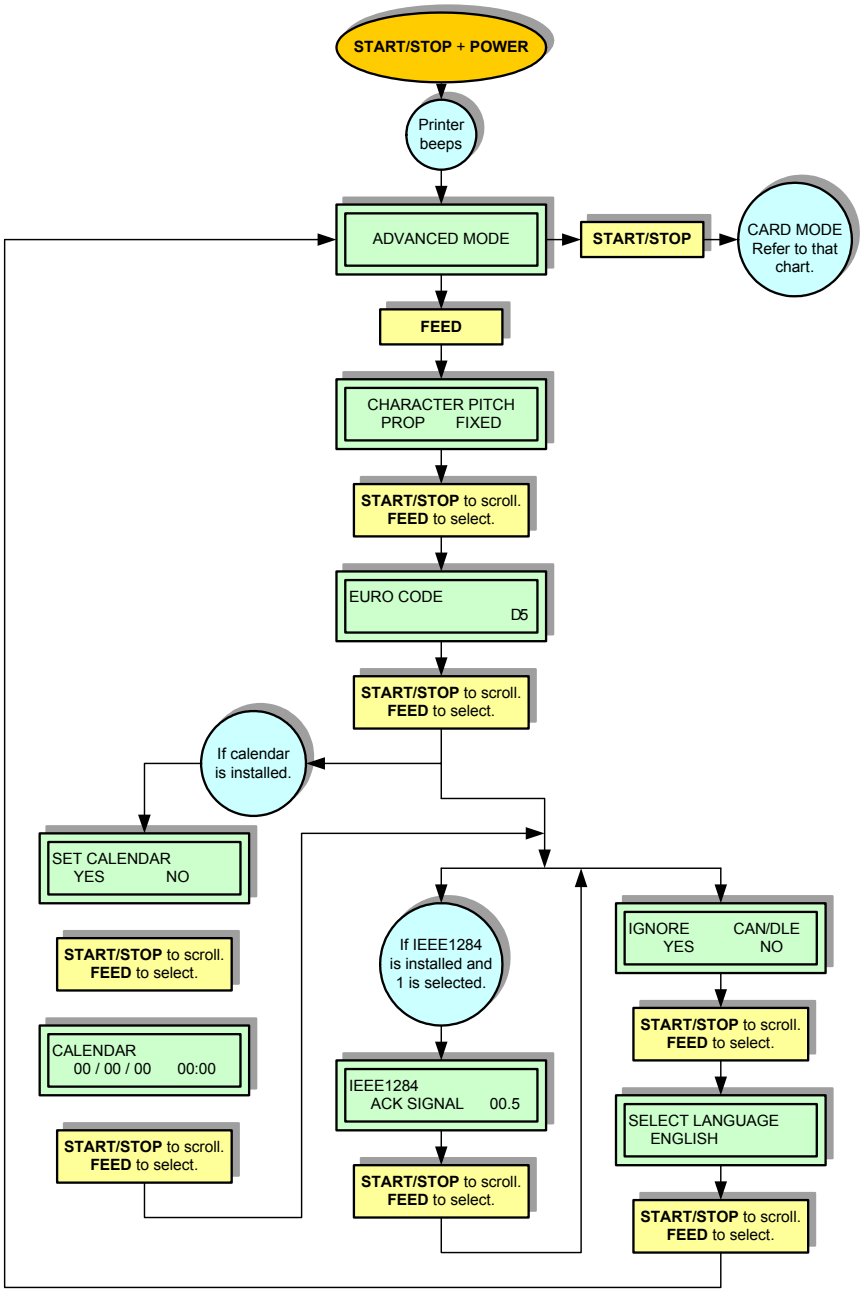


Figure 4-3, Advanced Mode

DEFAULT SETTINGS MODE

When the sequences have been completed, the printer automatically returns to its default gap or eye-mark settings. The default settings are those programmed settings of the factory prior to delivery.

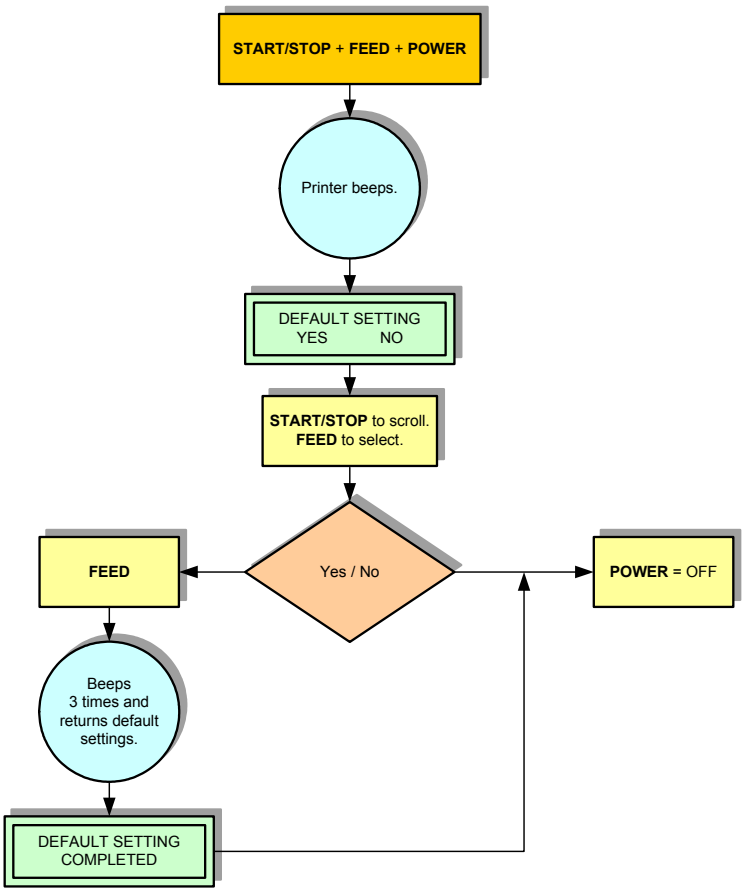


Figure 4-4, Default Settings Mode

FLASH MEMORY DOWNLOAD MODE

A Flash ROM internally stores and deletes font data and custom designed character data. The storage capacity for custom characters is 95 for each type of 16 x 16, 22 x 22, and 24 x 24 dots.

There are four transmission protocols for font download: (1) Download Font Storage, (2) Download Font Deletion, (3) Download Font Information Aquisition, (4) Storage Custom-Designed Character. The printer return status is set between STX (02H) and ETX (03H), and transferred in 3 bytes. Note that the return status for the font data transfer when storing font is 1 byte of ACK (06H). All status data transferred from the host are set between STX (02H) and ETX (03H), and transferred in 3 bytes.

DOWNLOAD FONT REGISTRATION			
STATUS DESCRIPTION	**ACSII**	**HEX**	**TRANSFER**
Not Already Stored	A	41	Printer to Host
Already Stored	B	42	Printer to Host
Storage Area NG	N	4E	Printer to Host
Store Font	0	30	Host to Printer
Do Not Store Font	1	31	Host to Printer
Ready For Storage Status	O	4F	Printer to Host
Font Storage Completed Normally	E	45	Printer to Host
Font Storage Cancelled	S	53	Printer to Host
Font Storage Completed Abnormally	Z	5A	Printer to Host

DOWNLOAD FONT DELETION			
STATUS DESCRIPTION	**ACSII**	**HEX**	**TRANSFER**
Not Already Stored	A	41	Printer to Host
Already Stored	B	42	Printer to Host
Delete Font	0	30	Host to Printer
Do Not Delete Font	1	31	Host to Printer
Font Deletion Completed Normally	E	45	Printer to Host
Font Deletion Cancelled	S	53	Printer to Host
Font Storage Completed Abnormally	Z	5A	Printer to Host

DOWNLOAD FONT INFORMATION AQUISTION			
STATUS DESCRIPTION	**ACSII**	**HEX**	**TRANSFER**
Not Already Stored	A	41	Printer to Host
Already Stored	B	42	Printer to Host
Font Information Transferred OK	0	30	Host to Printer
Number of Transferred Data	000000-999999	6 bytes w/30-39	Printer to Host
Font Information	Font Info Data + Font Data Info		Printer to Host

STORAGE OF CUSTOM DESIGNED CHARACTER			
STATUS DESCRIPTION	**ACSII**	**HEX**	**TRANSFER**
Storage Ready Status	O	4F	Printer to Host
Storage Completed Normally	E	45	Printer to Host
Storage Completed Abnormally	Z	5A	Host to Printer

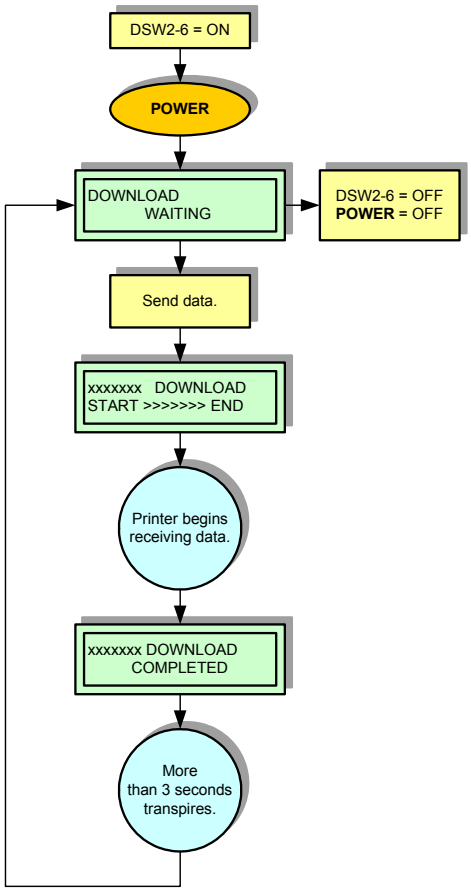


Figure 4-5, Flash Memory Download Mode

USER DOWNLOAD MODE

This download feature allows the operator to download print jobs to the printer. When downloading is complete, the LCD screen will return to the original display after three seconds. If an error occurs, a DOWNLOAD ERROR will display and identify the reason.

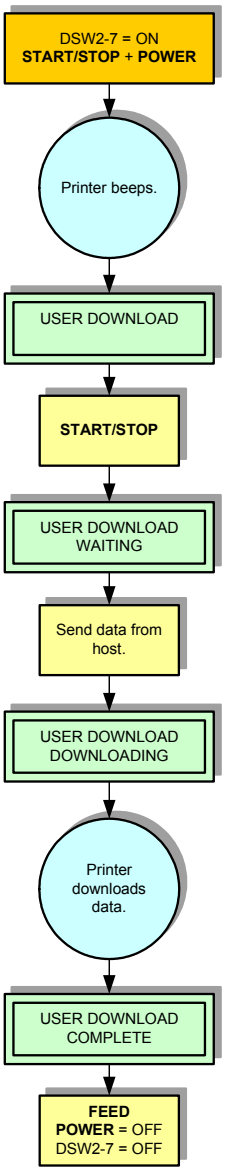


Figure 4-6, User Download Mode

HEX DUMP MODE

The contents of the print buffer and the data received before it is placed into the print buffer may be examined through the use of the Hex Dump Mode. Each line of the printed data is inumerated in the first column, the second column contains the data in hexadecimal format, and the right column contains the same data in ASCII format.

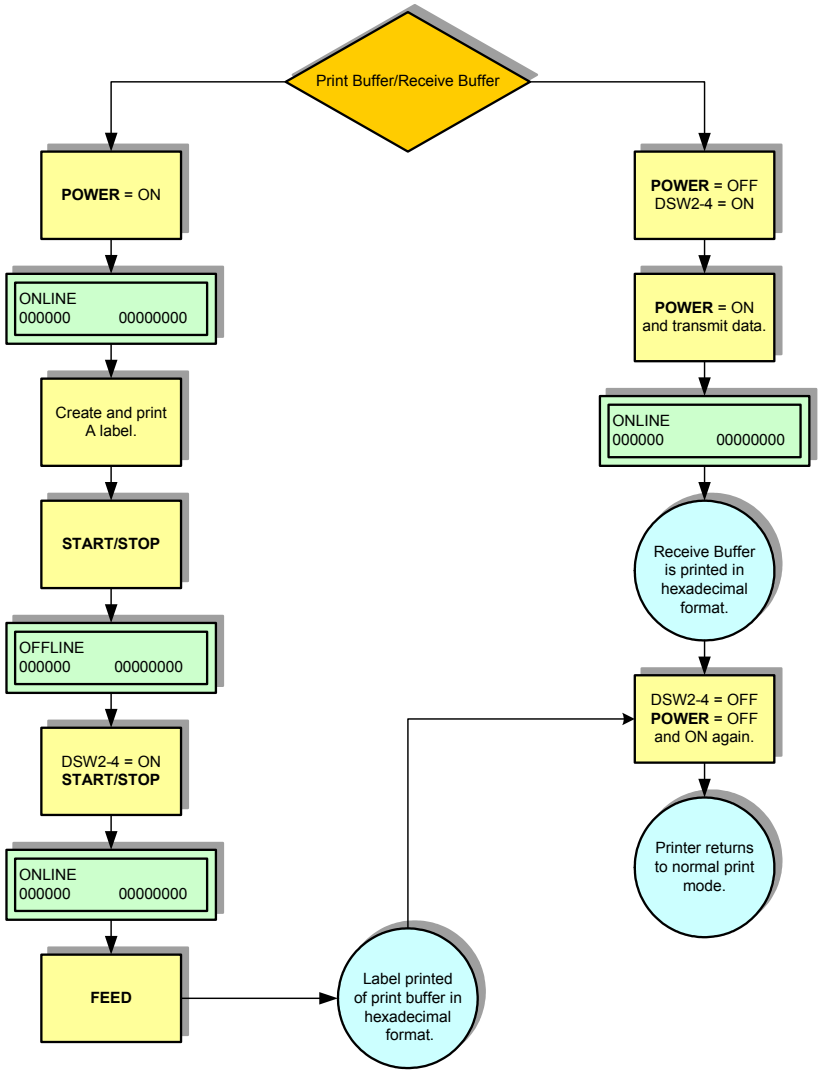


Figure 4-7, Hex Dump Mode

CARD MODE

This configuration mode is used for configuring the Flash ROM and/or PCMCIA interface cards. The following table identifies the menus of the Card Mode and their purpose. The flow chart after, sequences the operator, printer, and host interface activities.

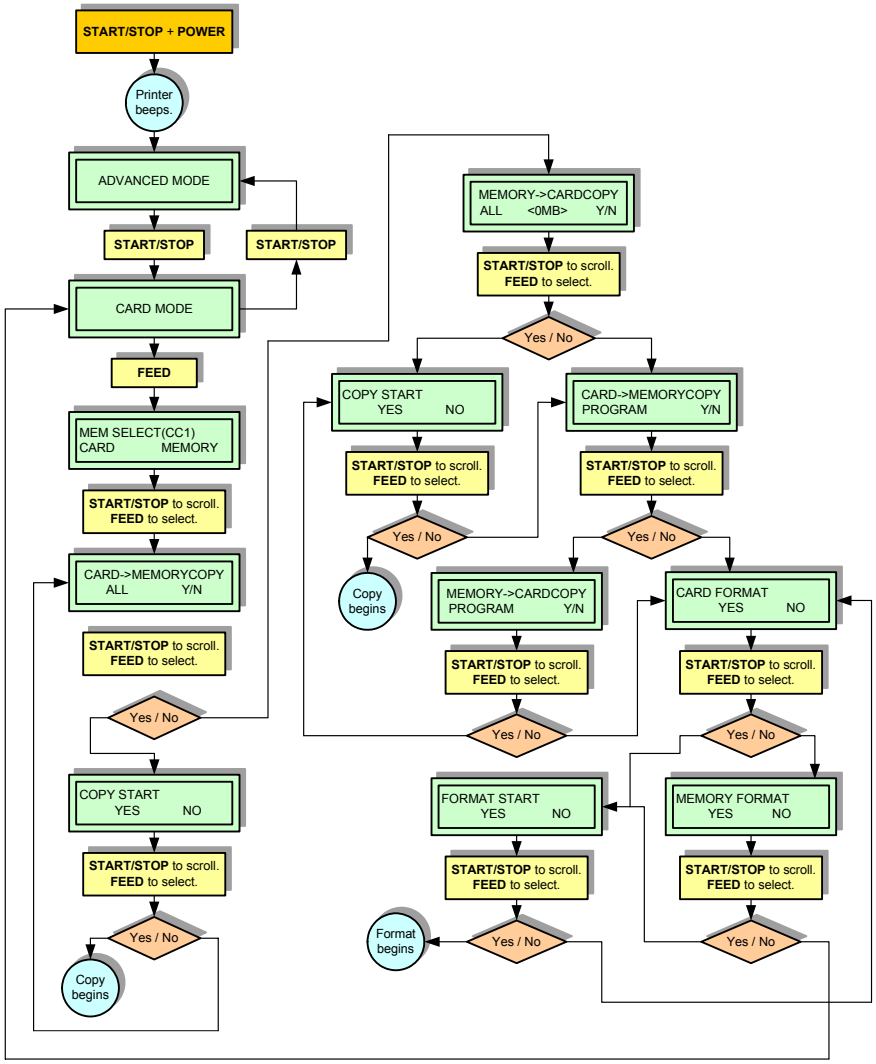


Figure 4-8, Card Mode

NON-STANDARD CLEAR MODE

Returns non standard protocol code to the default value. The default values are STX (7B), ETX (7D), ESC (5E), ENQ (40), NUL (7E), CAN (21), OFFLINE (5D). Follow the sequences in th flow chart below to perform this function.

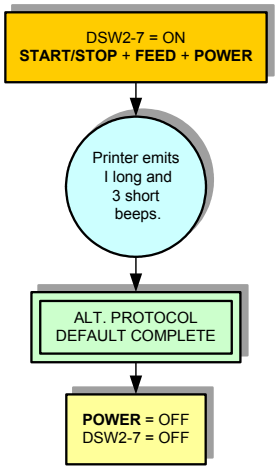


Figure 4-9, Non-Standard Clear Mode

SERVICE MODE

Allows the programming of various dimensional settings and the language used. Refer to the table below for an explaination of each menu encountered. The following flow chart provides configuration sequence.

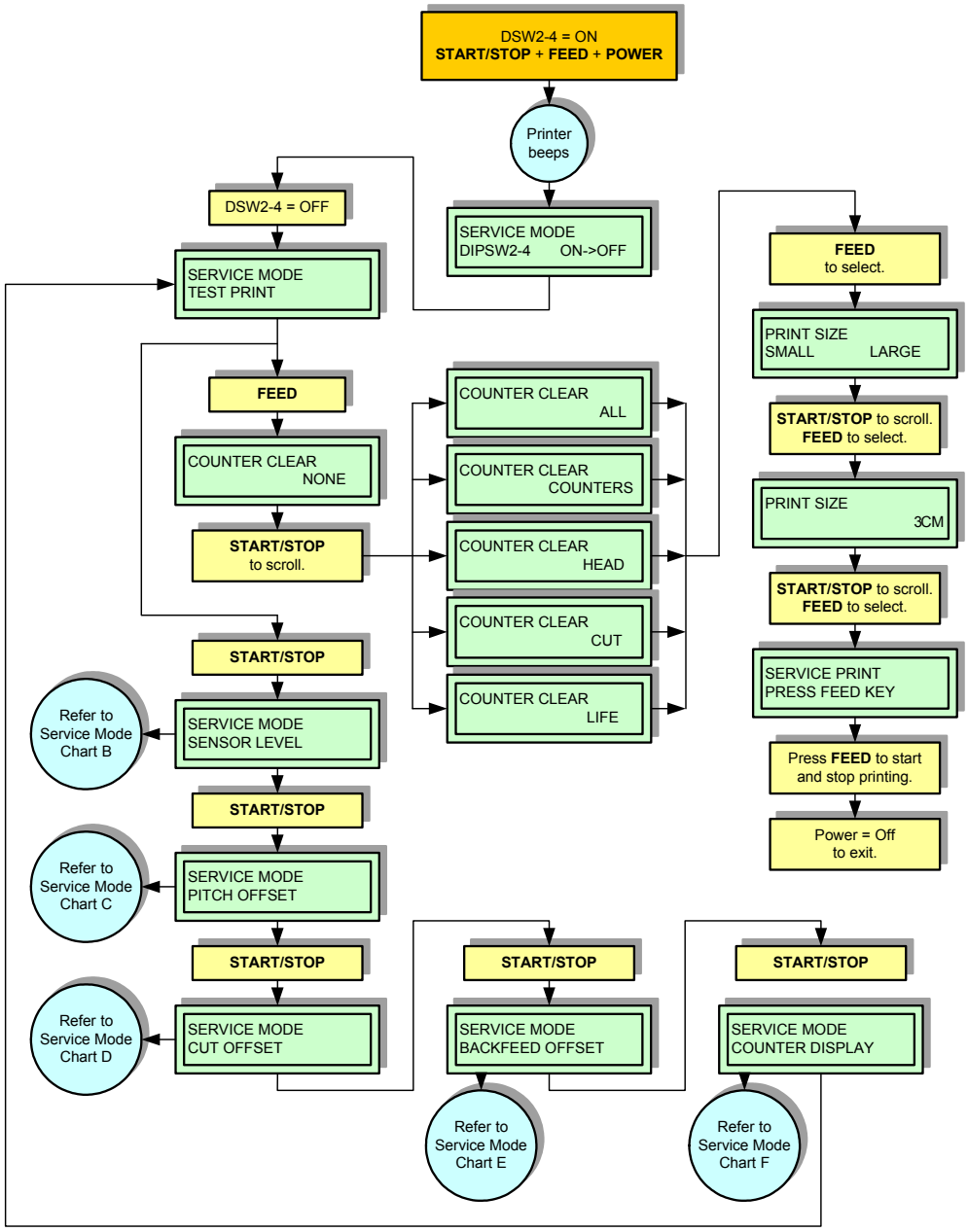


Figure 4-10a, Service Mode - Test Print

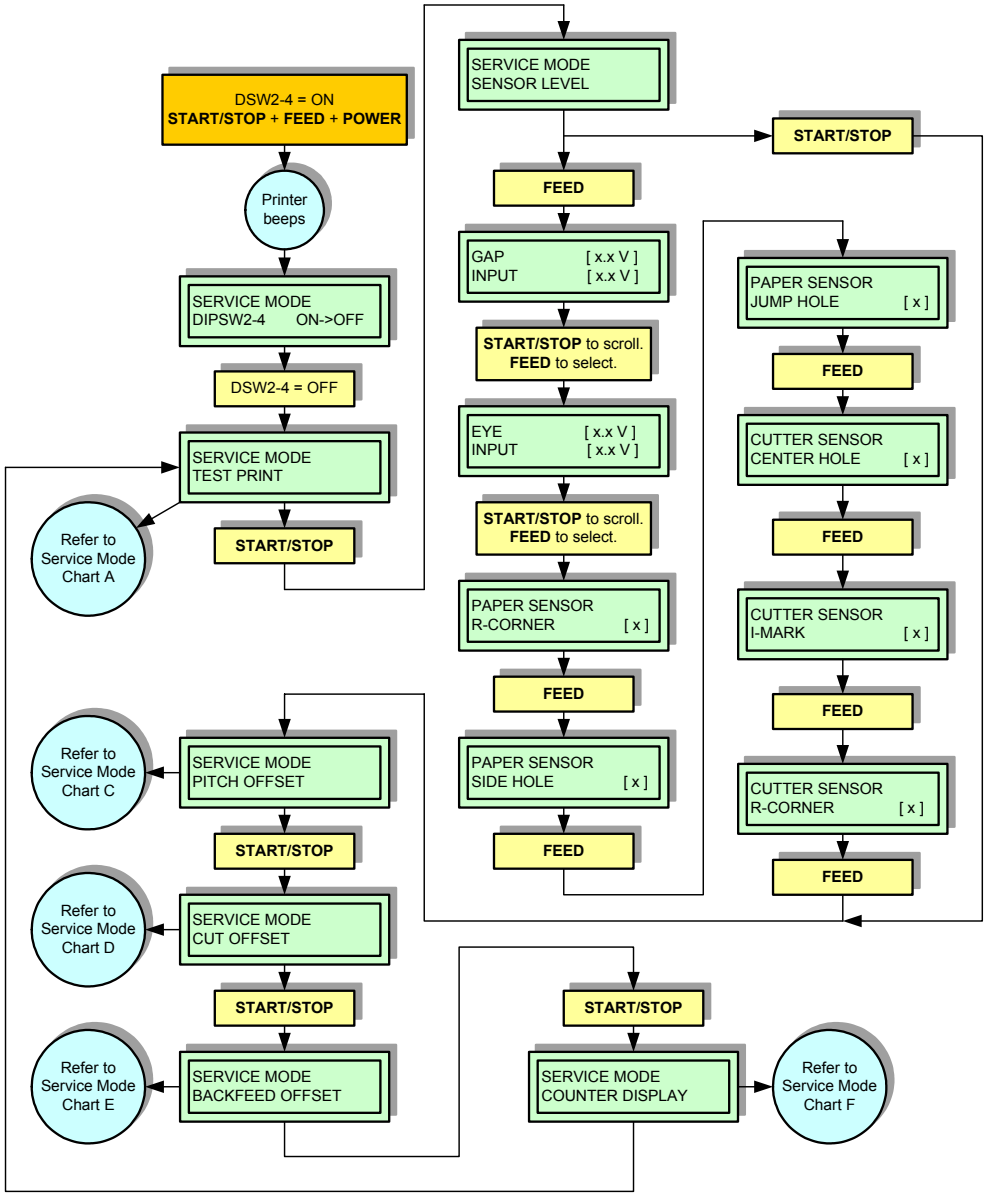


Figure 4-10b, Service Mode - Sensor Level

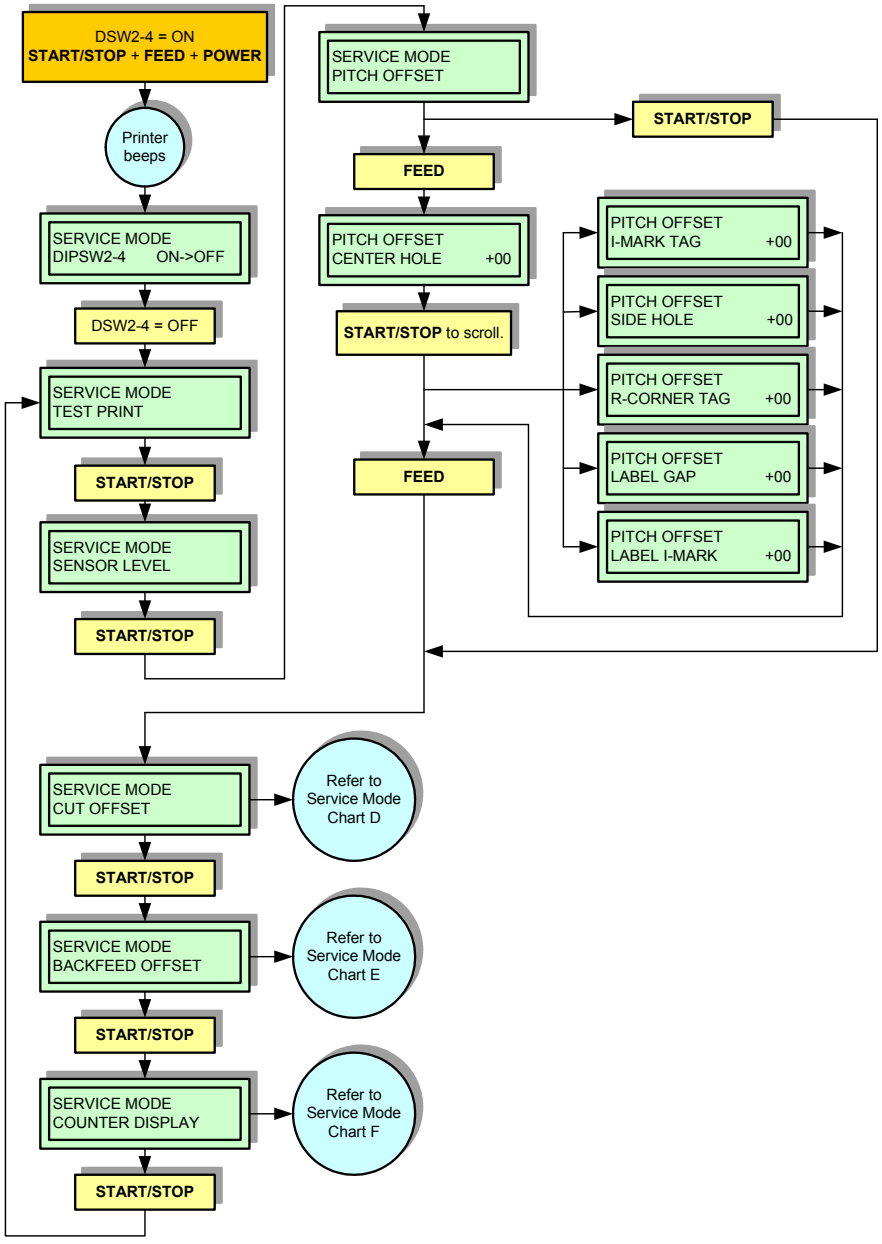


Figure 4-10c, Service Mode - Pitch Offset

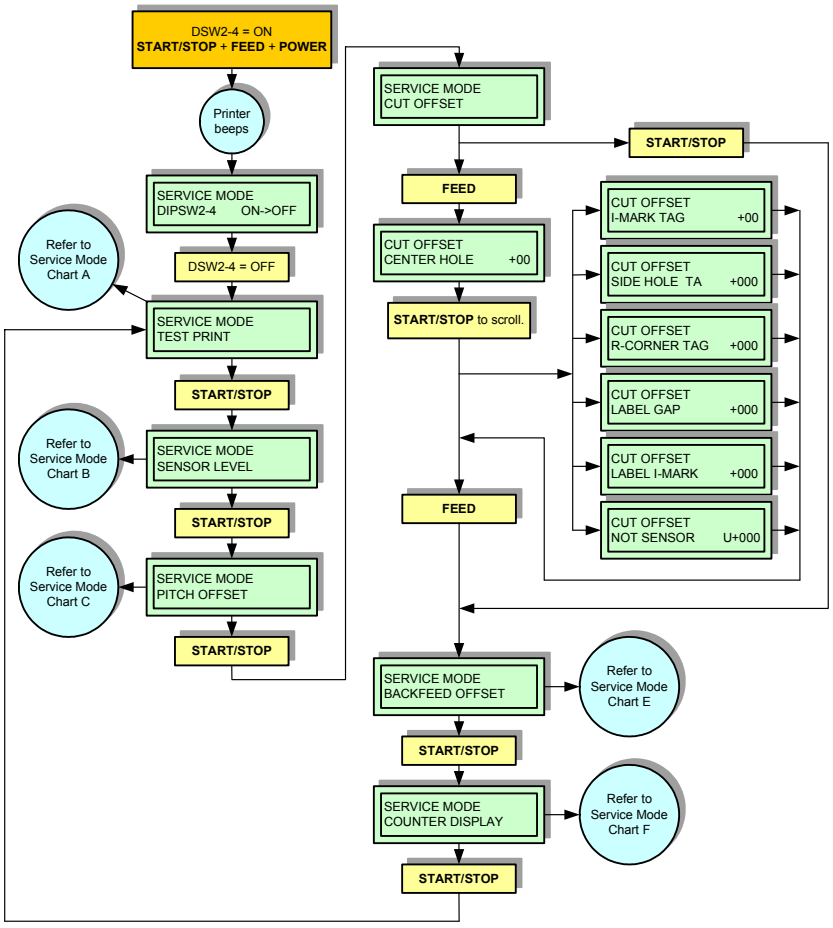


Figure 4-10d, Service Mode - Cut Offset

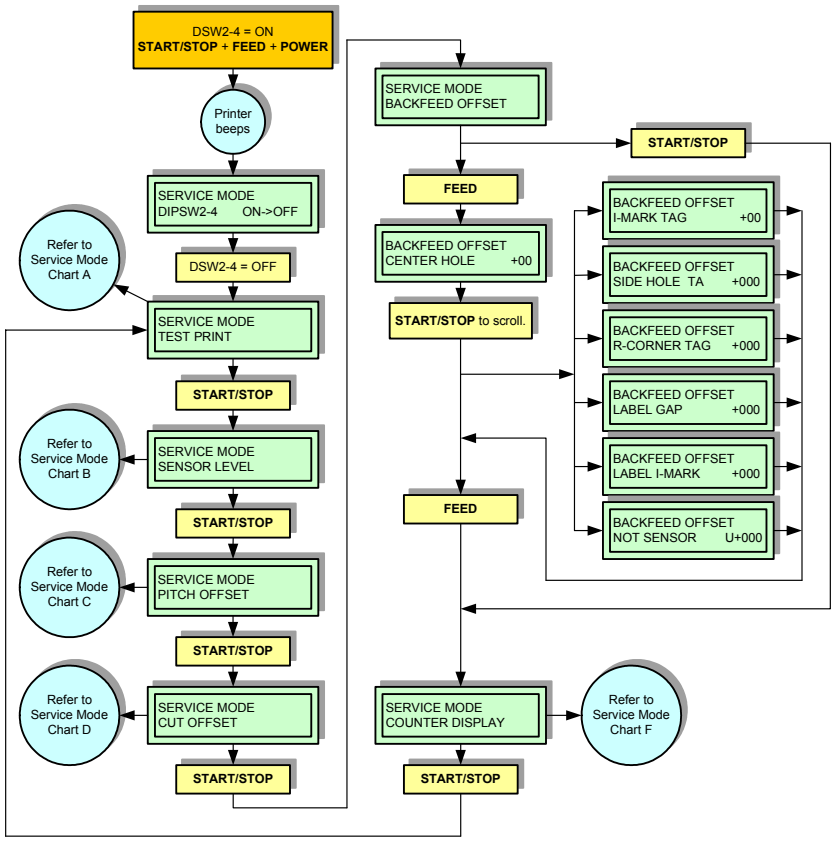


Figure 4-10e, Service Mode - Backfeed Offset

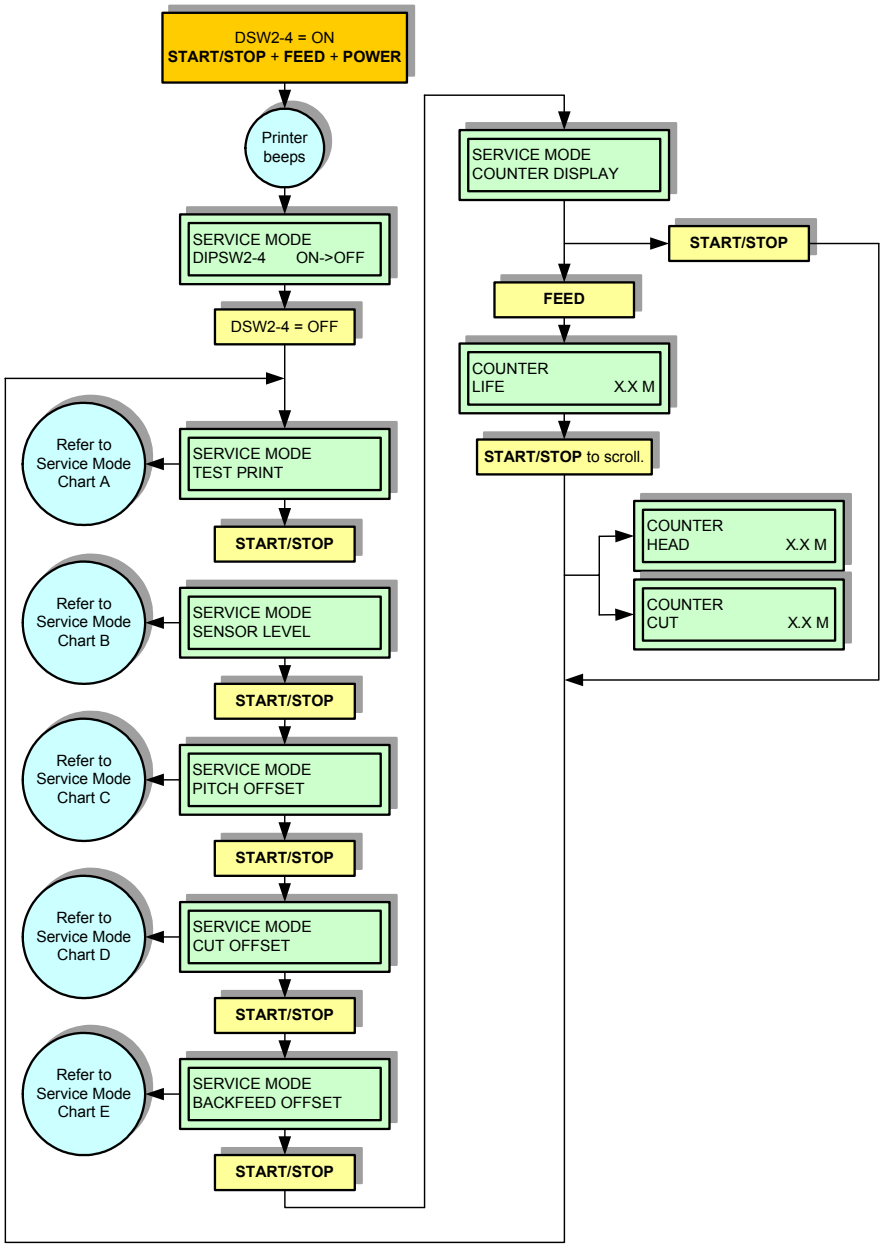


Figure 4-10f, Service Mode - Counter Display

NORMAL MODE	
MENU	**DESCRIPTION**
NORMAL MODE	Basic print functions.
ONLINE 000000 00000000	Receives data and can issue a label. Displays the countdown number and the count-up number in the lower region on the LCD.
CENTER HOLE 000000 00000000	Center Hole is the factory default media. If another media has been selected, that will be displayed. The countdown and count-up quantites is also displayed.
PRINT DARKNESS X X X X	Allows the selection of print density and displays the selection.
PRINT SPEED X X X X X	Allows the selection of printing speed and displays the selection. The print speed options are determined by the printer XL400e or XL410e being used. The lower digits are the slower speeds and ascends with the numeral digits. The speed is based on inches.
PRINT OFFSET V: +000 H: +000	Allows the entry of the horizontal and vertical print offset and displays the entry. The offset is determined by the number of dots with a range of 0 to 400. Either + or - options allow for the determination of a positive or negative numeral.
ZERO SLASH YES NO	Allows for the zero slash to be enabled or disabled. Zero slash enabled provides for a slash to be printed diagonally across the numeral zero to differentiate it from the letter “O”.
CANCEL PRINT JOB YES NO	Permits the print job to be aborted.
CANCEL PRINT JOB COMPLETED	Confirms the print job has been canceled or aborted.

DEFAULT SETTINGS MODE	
MENU	**DESCRIPTION**
DEFAULT SETTING YES NO	REturns the print density, print speed, offset correction, zero slash, and character pitch to their initial values. Press the FEED key to initiate. Switch power off to discontinue.
DEFAULT SETTING COMPLETE	After confirming the settings, turn the power off.

NON-STANDARD CODE CLEAR	
MENU	**DESCRIPTION**
ALT. PROTOCOL DEFAULT COMPLETE	Allows the non-standard protocol code to its default values. The default values are: STX (7B), ETX (7D), ESC (5E), ENQ (40), NULL (7E), CAN (21), and Offline (5D).

ADVANCED MODE	
MENU	**DESCRIPTION**
ADVANCED MODE	Menu allows configuration of printer features that typically do not require change.
CHARACTER PITCH	The PROP option allows proportional pitch and the FIXED option is without. The FIXED option sets printing so that each font occupies the same amunt of lateral space regardless of a given character width. For example, the character “i” would occupy the same space laterally as the character “s” even though the “s” is obviously wider. Proportional printing accomidates printing to the width of each printed character. Fonts XU, XS, XM, XB, XL, and X70 to X77 are valid.
EURO CODE	Sets Euro Code. Selects the assigned code of the Euro mark. The default value is D5 (HEX). START/STOP key moves the cursor and the FEED key selects the option.
SET CALENDAR	Displays only if the option is installed. This feature permits the printing of the date and time of print occurance onto the label. If the YES option is selected, a secondary menu will display for date and time entry.
AUTO ONLINE	Determines the mode in which the printer powers up. If the YES option is selected, the printer will power up in the online mode and ready to print. If the NO option is selected, the printer will power up in the offline mode and will require to manually be brought online.
IEEE1284 ACK SIGNAL 00.5	Sets to ACK signal width of the IEEE1284. Displays only when the IEEE1284 board is installed. The default value is 00.5.
SELECT LANGUAGE	Sets the language to be displayed on the LCD screen. There are eight language options available. START/STOP key moves the cursor and the FEED key selects the option.

FLASH MEMORY & USER DOWNLOAD MODES	
MENU	**DESCRIPTION**
DOWNLOAD WAITING	Indicates the printer is waiting for the program/font data to be received from the host.
xxxxxxxxxxx DOWNLOAD DOWNLOADING	Indicates the current downloading mode.
xxxxxxxxxxx DOWNLOAD COMPLETED	Indicates the current download mode. After displaying the message for 3 seconds, it auatomatically returns to the selection display.
DOWNLOAD ERROR xxxxxxxx ERROR	Indicates the contents of the error. Press FEED to return to the selection screen.

CARD MODE	
MENU	**DESCRIPTION**
CARD MODE	Menu allows configuration of the memory card.
MEM SELECT(CC1) CARD MEMORY	Establishes the media of the first drive. The default value is on the card. START/STOP key moves the cursor and the FEED key selects the option.
CARD->MEMORYCOPY ALL Y/N	Allows the copying of the entire card contents into Flash ROM. START/STOP key moves the cursor and the FEED key selects the option.
MEMORY->CARDCOPY ALL <?MB> Y/N	Allows the copying of the entire contents of the Flash ROM or firmware. A 4MB card or greater is required. An error occurs if an insufficient memory card is used.
CARD->MEMORYCOPY PROGRAM Y/N	Allows corying of Firmware program. Can overwrite the Firmware program card in program ROM. A program card is created by copying to the memory card of the Firmware mentioned later.
MEMORY->CARDCOPY PROGRAM Y/N	Allows copying of the Firmware program in the memory card. A 2MB card or greater is required. START/STOP key moves the cursor and the FEED key selects the option.
CARD FORMAT YES NO	Allows formatting of the memory card and to clear all internal contents. START/STOP key moves the cursor and the FEED key selects the option.
MEMORY FORMAT	Allows formatting of Flash ROM memory. START/STOP key moves the cursor and the FEED key selects the option.
xxxxxxx START YES NO	Initiates the copying or formatting activity. START/STOP key moves the cursor and the FEED key selects the option.
COPYING	Displays that the copying or formatting activity is underway.
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx COMPLETED	Displays that the copying or formatting activity is complete. After 3 seconds of display, returns to the original screen.
CARD COPY/FORMAT ERROR	Displays if the copying or formatting activity incuured an error and could not complete. The FEED key returns the display to the original screen.
CARD ID ERROR PRESS FEED KEY	Displays when the incorrect card has been selected. The FEED key returns the display to the original screen.

USER TEST PRINT MODE	
MENU	**DESCRIPTION**
TEST PRINT MODE CONFIGURATION	Allows the selection of the desired test print type. Press START/STOP to scroll the options and FEED to select.
PRINT SIZE 03CM	Sets the width of test print media. START/STOP key moves the cursor and the FEED key selects the option.
USER TEST PRINT PRESS FEED KEY	Initiates test printing. Press the FEED key to initiate test printing and FEED again to interrupt.

SERVICE MODE	
MENU	**DESCRIPTION**
SERVICE MODE	Menu allows configuration media type.
COUNTER CLEAR NONE	Selects the counter to clear. The options are None, All, Print Head, Cutter, and Dispenser. The default value is NONE: Do not clear. START/STOP key moves the cursor and the FEED key selects the option.
PRINT SIZE SMALL LARGE	Sets the print size for the test print. START/STOP key moves the cursor and the FEED key selects the option.
PRINT SIZE 3CM	Sets the width of test print media. START/STOP key moves the cursor and the FEED key selects the option.
SERVICE PRINT PRESS FEED KEY	Initiates test printing. Press the FEED key to initiate test printing and FEED again to interrupt. Press EJECT to eject a label or tag when printing is interrupted.
GAP x.xV INPUT x.xV	Sets slice level. Sets the threshold level between 0-3.2. When the value is set at 0, auto setting is done through the firmware software. START/STOP key moves the cursor and the FEED key selects the option.
I-MARK x.xV INPUT x.xV	Sets the eye-mark sensor threshold. Sets the threshold level between 0-3.2. When the value is set at 0, auto setting is done through the firmware software. START/STOP key moves the cursor and the FEED key selects the option.
PAPER SENSOR R-CORNER [X]	Displays the status of the paper under the R-Corner Sensor (to check the sensor only). When “0” is displayed, media is not detected. When “1” is displayed, media is detected. The FEED key advances to the next sensor display.
PAPER SENSOR SIDE HOLE [X]	Displays the status of the paper under the Side Hole Sensor (to check the sensor only). When “0” is displayed, media is not detected. When “1” is displayed, media is detected. The FEED key advances to the next sensor display.
CUT OFFSET CENTER HOLE +000	Selects the media type to be set. Press START/STOP to scroll the media options and the FEED key to select.
CUT OFFSET CENTER HOLE +000	Sets the cut offset value. The range is +/- 0 to 999. Press START/STOP to scroll the options in each field and FEED to advance when each is set.
SERVICE MODE BACKFEED OFFSET	The FEED key shifts to backfeed offset settings and the START/STOP key the Counter Display selection.
BACKFEED OFFSET CENTER HOLE +00	Selects the media type to be set. Press START/STOP to scroll the media options and the FEED key to select.
BACKFEED OFFSET CENTER HOLE +00	Sets the cut offset value. The range is +/- 0 to 99. Press START/STOP to scroll the options in each field and FEED to advance when each is set.
SERVICE MODE COUNTER DISPLAY	The FEED key shifts to the Counter Display selection and the START/STOP key the Counter Clear selection.
COUNTER DISPLAY LIFE	Selects the counter type to be displayed. Press START/STOP to scroll options and the FEED key to select.

OPERATIONAL ADJUSTMENTS

These operational adjustments are for fine tuning the printer as necessary following the configuration process and are confined to the three potentiometers located on the adjustment panel in addition to the operator panel. Refer to the table below for their function.

POTENTIOMETER	DESCRIPTION/PROCEDURE
DARKNESS (**VR1**)	Is used to adjust the darkness or lightness of the printed image and should be used in conjunction with the configuration adjustments. Make course adjustments there and then fine tune here. If unable to achieve the desired setting here, the course adjustment must be reset. Adjust this potentiometer as labels are being printed. Allow two labels to be printed for each adjustment to ensure a desired setting.
CUT POSITION (**VR2**)	The offset adjustment is used to reposition the media for printing following advancement for cutting and dispensing. A label is printed, it is fed forward for dispense, the printer retracts the remaining media (offset) to print the next label.
PRINT POSITION (**VR3**)	Is to be used in conjunction with the configuration adjustments. Make course adjustments there and then fine tune here. If unable to achieve the desired setting here, the course adjustment must be reset. Adjust this potentiometer as labels are being printed. Allow two labels to be printed for each adjustment to ensure a desired setting. Adjustment of the Print Position potentiometer will affect the print offset postion. Thusly, if using a dispenser or cutter, adjust the Cut Position first and then the Print Position.
DISPLAY (**VR4**)	This potentiometer allows illumination adjustment of the LCD panel. To adjust, power on the printer and turm the VR4 potentiometer as necessary to achieve the desired results.

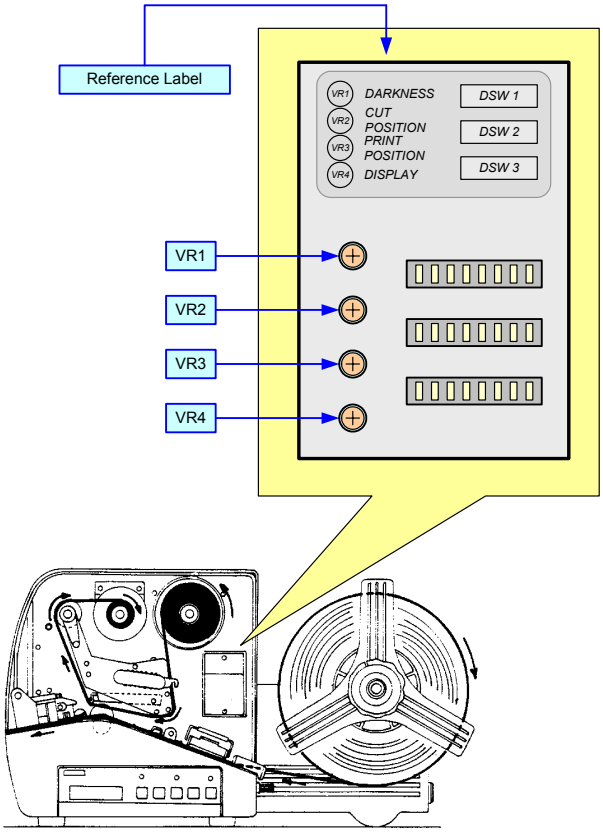


Figure 4-11, Adjustment Panel

CUTTER SENSOR POSITIONING

The cutter assembly has dual adjustable sensors and is designed to permit lateral movement of the sensor assembly to accomdate multiple media types. To position the sensor, loosen its set screw and move the sensor assembly along the incremented scale to the correct position so that it aligns with its reference mark on the media and then retighten the set screw. Then select which of the dual sensors is also applicable to the media of use.

> NOTE: In order for the sensor to function properly, it must be correctly positioned and the switch properly set for the applicable media. If the cutter assembly still does not operate correctly, the sensor's sensitivity may require adjustment. Refer to the Maintenance Unit for instructions on sensor sensitivity adjustment.

If the media was incorrectly positioned following sensor adjustment, press the FEED key to reposition. If the power was removed while printing, the media may be incorrectly positioned when power is restored and may print several blank tags. Press the START/STOP key to pause the print job and switch off power. When power is restored, the printer will correctly position the tags.

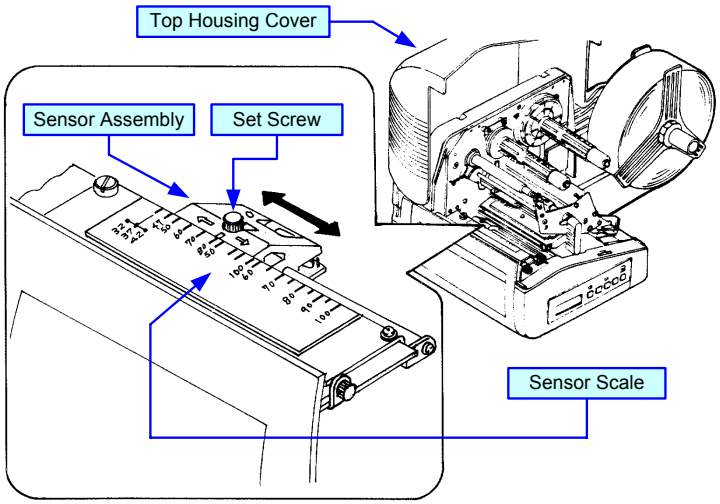


Figure 4-14a, Cutter Sensor Positioning

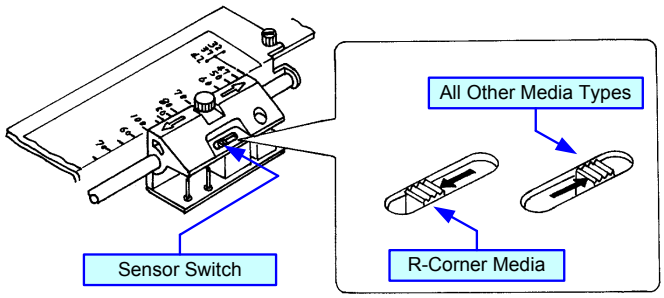


Figure 4-14b, Cutter Sensor Positioning

OPERATOR PANEL

The operator panel may be used at two different angles. The normal angle is flush with the surface of the printer. Pressing against the upper portion of the panel causes it to tilt backwards to allow better viewing under certain situations. To release the panel from the tilted angle, move the release button located above the panel to the right.

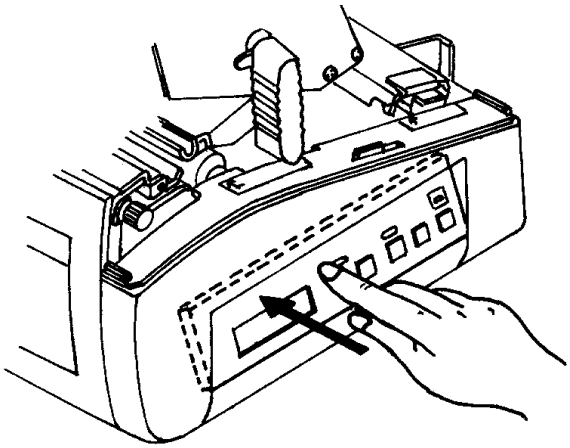


Figure 4-15a, Tilting Operator Panel

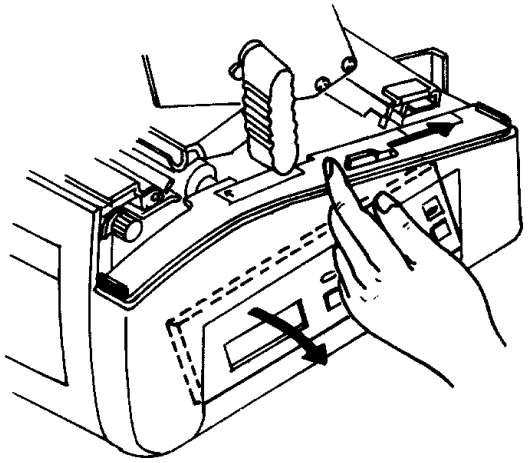


Figure 4-15b, Releasing Operator Panel

PRINTING

At this point, both the printer and the operator should be ready to print labels or tags. One can begin by commencing production or by printing a test label first. To begin production, simply use the operator panel as directed in the Introduction unit of this manual.

TEST PRINTING

A test label is designed to assist in the identification of print problems. Refer to the Troubleshooting unit of this manual for instructions on printing a test label. Once identifying any print issues that may prevail, refer to the Maintenance unit for specific instructions on remedy.

> NOTE: If the instructions being sought are not present in the Maintenance unit, those instructions have been deemed too complex for the operator to perform. Contact your service representative for assistance.

RELOADING MEDIA

When replenishing the media supply with the same type and size, it's not necessary to power the printer off. Once properly loading the media, press the START/STOP key and the printer will automatically feed and correctly position the media for printing.

POWERING OFF

Before powering off the printer, feed the printed labels or tags from the printer by pressing the EJECT key while the printer is online. Any printed media that is remaining in the printer will be ejected and cut. The unprinted media will be retracted to place the first print line under the print head.

> NOTE: The eject operation may be controlled via software commands from the host, as well as, locally.

After the printed media has been ejected from the printer, place the printer in the offline state before removing power. If the label/tag position is not disturbed while the power is off, the first printable label/tag will be in the correct position when the power is reapplied. The media type setting is retained in the printer's memory even though power is removed. When the power is reapplied, the first print line of the label/tag will be correctly positioned under the print head for printing.

5

TROUBLESHOOTING

- **Error Signals**
- **Printer Troubleshooting**
- **InterfaceTroubleshooting**
- **Performance Testing**
- **Test Print Troubleshooting**
- **Sensor Locations**

ERROR SIGNALS

This unit coorelates the three types of error signals with probable causes and problem resolution. Three types error signals are: LED, LCD Message, and an audible beep.

ERROR SIGNAL TABLE

LED	LCD MESSAGE	BEEP	REMEDY
Error on	MACHINE ERROR	1 long	Cycle power off/on. Replace board.
Error on	EEPROM ERROR	1 long	Cycle power off/on. Replace board.
Error on	HEAD ERROR	3 short	Replace print head. Cycle power off/on.
Error on	SENSOR ERROR	3 short	Ensure proper media guide adjustment. Ensure proper sensor selection/adjustment. Replace applicable sensor.
Error blinking	CARD R/W ERROR	1 long	Format memory card. Cycle power off/on.
Error blinking	CARD LOW BATTERY	1 long	Replace memory card battery. Cycle power off/on.
Error blinking	HEAD OPEN	3 short	Ensure the print head is latched. Replace head-open sensor.
Error on Line blinking	PARITY ERROR	3 short	Ensure correct settings. Ensure correct connection.
Error on Line blinking	OVERRUN ERROR	3 short	Ensure correct settings. Ensure correct connection. (Null Modem)
Error on Line blinking	FRAMING ERROR	3 short	Ensure correct settings. Ensure correct connection. (Null Modem)
Error on Line blinking	BUFFER FULL	3 short	Ensure correct settings. Cycle power off/on.
Error blinking Label on	PAPER END	3 short	Ensure media present. Ensure correct sensor adjustment. Adjust the VR7 potentiometer to 0.2V.
Error blinking	RIBBON END	3 short	Ensure ribbon present. Latch/unlatch print head.
Error blinking	MEDIA ERROR	3 short	Ensure correct media type. Latch/unlatch print head.
Error blinking	STACKER FULL	3 short	Empty stacker.
Error blinking	REWINDER FULL	3 short	Remove roll.
Error blinking	CUTTER ERROR	3 short	Clean and cycle power. Replace cutter unit.
Error blinking	CUTTER SENSOR ERROR	3 short	Clean sensor.

PRINTER TROUBLESHOOTING

TROUBLESHOOTING TABLE	
IMAGE VOIDS	
Damaged print head.	Replace print head.
Damaged electronics.	Replace circuit board.
Damaged or worn platen roller.	Replace platen roller.
Vertical line in printed image.	Dirty or defective print head.
LIGHT PRINT IMAGES	
Low print head energy/darkness.	Adjust darkness control.
Low print head pressure.	Adjust head balance.
Foreign material on print head.	Clean print head and platen roller.
Poor head alignment.	Align print head as required.
Excessive print speed.	Reduce print speed setting.
UNEVEN PRINT DARKNESS	
Unbalanced print head.	Ensure correct balance.
Worn platen roller.	Replace platen roller as required.
Dirty print head.	Clean as necessary.
SMEARED PRINT IMAGES	
Poor label quality.	Use high quality label stock.
Foreign material on print head and platen roller.	Clean print head and platen roller.
Foreign material on labels.	Use high quality label stock.
Excessive print head energy.	Adjust darkness control.
Excessive print speed.	Adjust as speed as required.
Excessive head pressure.	Adjust head balance.
NO LABEL MOVEMENT	
Loose timing belt.	Ensure motor mount screws are tight, belt properly tensioned.
Incorrect label pitch sensor selected.	Select the correct label sensor type.
No voltage output.	Replace fuse on main circuit board. Test power supply and replace as required.
Drive motor not operating.	Ensure wiring harness connection. Replace as necessary.
Defective main board.	Troubleshoot board and replacee as nwecessary.

NO PRINTED IMAGE	
Print head is disconnected.	Ensure print head wiring harness is connected on each end.
No voltage output.	Test power supply and replace as necessary.
Damaged print head.	Replace print head.
Damaged electronics.	Replace circuit board.
Interface problems.	Check. Refer to relative instructions below.
Data input error.	Ensure correct data stream.
LCD FIELD ILLUMINATED BUT WITHOUT WORDS OR NO DISPLAY AT ALL	
Power cable issues.	Ensure properly connected. Ensure not defective.
Inproperly set display potentiometer.	Adjust as required.
Defective power supply.	Troubleshoot and replace components as necessary.
MEANDERING MEDIA	
Incorrectly loaded media.	Ensure correct loading.
Improperly adjusted media guides.	Adjust as required.
Unbalanced print head.	Adjust as required.
Worn or improperly adjusted platen roller.	Adjust. Replace as required.
PRINTER CREATES A BLANK LABEL	
Data input error.	Ensure correct data stream.
Improper media selected.	Ensure correct media is in use.
Disconnected print head.	Cycle off power and ensure proper connection.
Defective print head.	Replace print head as required.
Defective main board.	Replace main board as required.
INCORRECT LABEL POSITIONING	
Incorrect sensor selection.	Ensure the correct sensor is selected.
Improper sensor adjustment.	Adjust as required.
Incorrect media in use.	Ensure the correct media is being used.
Data input error.	Ensure correct data stream.
RIBBON WRINKLING	
Poor head alignment.	Adjust head balance, ribbon roller, and head alignment.
Poor ribbon tension.	Adjust tension as required.
Worn platen.	Replace as necessary.
Foriegn material on head or platen.	Clean as required.
Foriegn material on labels.	Use high quality label stock.
Damaged print head.	Replace print head as required.

INTERFACE TROUBLESHOOTING

This unit provides a checklist for the various interface types. Locate the checklist relative to the interface used and perform each of the troubleshooting tasks until the problem has been isolated.

PARALLEL INTERFACE	
CHK	**TROUBLESHOOTING STEP**
	Ensure the interface module is correctly installed. Run self-test to verify.
	Ensure the printer cable is connected to the appropriate LPT port on the host computer. If using a Windows printer driver, ensure the correct port is selected.
	Ensure a IEEE1284 printer cable is being used.
	Ensure the host's peripherial settings are set to ECP for faster throughput. Refer to the computer manufacturer's documentation for details.
	Ensure the printer is receiving information from the computer using the Receive Buffer Hex Dump mode. Refer to that procedure within this manual for instructions. The command stream should be continuous and possess 0Dhex and/or 0Ahex (carriage return and line feed) characters throughout. However, there should not be either locate between the start (<ESC>A and the stop (<ESC>Z) commands.
	Replace the interface board with another to isolate the problem.
	Replace the interface baord permanently if determined to be the problem.

RS232 SERIAL INTERFACE	
CHK	**TROUBLESHOOTING STEP**
	Ensure the correct interface module is correctly installed. Run self-test to verify.
	Ensure the serial cable (Null Modem) meets specifications and is correctly connected at each end.
	Ensure the serial cable is not defective.
	Ensure the communication parameters for the baud rate, parity, data bits and stop bits are consistent with those being sent from the host computer.
	Ensure the printer is receiving information from the computer using the Receive Buffer Hex Dump mode. Refer to that procedure within this manual for instructions. The command stream should be continuous and possess 0Dhex and/or 0Ahex (carriage return and line feed) characters throughout. However, there should not be either locate between the start (<ESC>A and the stop (<ESC>Z) commands.
	Replace the interface board with another to isolate the problem.
	Replace the interface baord permanently if determined to be the problem.

LAN EHTERNET INTERFACE	
CHK	**TROUBLESHOOTING STEP**
	Ensure the interface has been correctly configured. Wait two minutes and run self-test to verify. If a test label does not print, there ma y be a hardware problem.
	Ensure the serial cable meets specifications and is correctly connected at each end.
	Ensure the cable and its ports are not defective.
	Ensure that a faulty print server or other protocol related senarios are not creating a queue setup issue. Systematically perform checks and tests to isolate the cause.
	If using TCP/IP, ensure a valid IP address is specified and that all parameters are correct (subnet mask, gateway, etc.). Attempt to PING the IP address assigned to the network interface.
	Install the IPX/SPX protocol on a workstation to determine if the network device can be discovered via the MAC address. If able, configure the appropriate protocols and retest connectivity.
	Use a crossover cable to isolate the printer from the network by connecting from the interface and workstation. Verify that the parameters match on each. Test connectivity.

UNIVERSAL SERIAL BUS (USB) INTERFACE	
If nothing prints during a test print, verify the device drivers have been successively installed by performing the following:	
	Click on Start, Settings, and then Control Panel.
	Click on System within the new window.
	Click on the Device Manager tab.
	Ensure that the View Device By Type is checked.
	Scroll to SATO-USB Device and ensure that errors do not exist. Reinstall as required.
	Reboot the PC and the printer.
	Contact Microsoft technical support for further assistance as required.

PERFORMANCE TESTING

This unit explains how to troubleshoot circuitry and adjust sensors using a multimeter. These activities may be performed with or without test module assistance in conjunction with the multimeter.

MULTIMETER WITH TEST MODULE

The SATO Test Module is is a purchase option designed and sold by SATO America to assist in troubleshooting SATO Printers. The use of this device will facilitate the identification and isolation of problem circuitry and for voltage adjustment.

1 Remove the small cover located on the left side of the printer to access the test panel.
2 Connect the Test Module to the available test connector.
3 Connect the multimeter ground probe to the pin identified as GRD on the Test Module.
4 Connect the multimeter positive probe to the pin identified as SIG on the Test Module.
5 Turn the printer on and rotate the Test Module dial to the required position.
6 Record the multimeter values and confirm that they are within specified tolerences.
7 Troubleshoot and replace components as directed in their respective procedures.

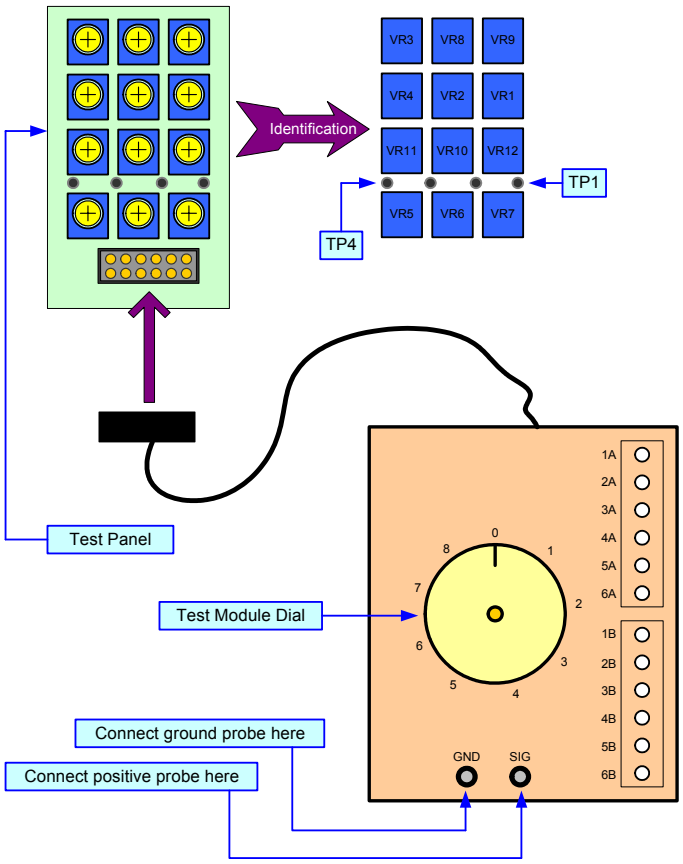


Figure 5-1, Test Module Usage

TEST CHART		
MODULE DIAL	**CONNECTOR PIN**	**FUNCTION**
	1A	This test connector pin is used as the ground post.
	2A	
0	3A	Used to determine voltage of components that require between +4.8 and +5.2 VDC to properly function.
1	4A	Used to determine voltage of components that require between +11.4 and +12.6 VDC to properly function.
2	5A	Used to determine voltage of components that require between -11.4 and -12.6 VDC to properly function.
3	6A	Used to determine voltage of components that require between +23.5 and +24.5 VDC to properly function.
4	1B	Used in cunjunction with potentiometer VR2 to set the eye-mark media sensor sensitivity.
5	2B	Used in cunjunction with potentiometer VR1 to set the gap or center hole media sensor sensitivity.
6	3B	Used in cunjunction with potentiometer VR3 to set the ribbon sensor sensitivity
7	4B	Used in cunjunction with potentiometer VR5 to set the edge-hole media sensor sensitivity.
8	5B	Used in cunjunction with potentiometer VR6 to set the notched tag media sensor sensitivity.
	6B	Used in cunjunction with potentiometer VR7 to set jump sensor.

MULTIMETER ALONE

Testing of circuitry and sensor adjustment may be performed by using a multimeter without the assistance of the test module. To perform this task the multimeter probes must be attached to the correct connector pins of the test connector. Refer to the table above to correlate the desired testing or adjustment function with its relative connector pin. Afterward, refer to the table below to locate the required pins. Refer to the Adjustment Procedures chapter of the Operation unit for specific adjustment instructions if necessary and applicable.

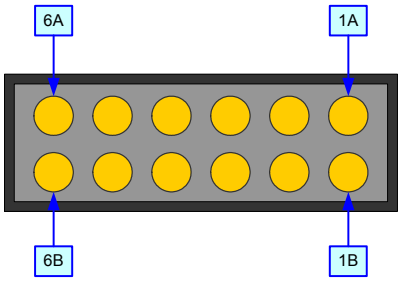


Figure 5-2, Test Connector

TEST PRINT TROUBLESHOOTING

Chapter provides instruction on special printing to identify and resolve specific print problems.

HEX DUMP Allows the operator to determine if there were problems in the downloading of data.

TEST LABEL Allows the operator to identify specific problems regarding mechanical performance and setup.

HEX DUMP MODE

The contents of the print buffer can be examined using the Hex Dump Mode. In the left column, each line of data received is numbered. The center column provides the data in hexadecimal format. And in the right column, same data is provided in the ASC II format. Follow the flow chart provided below to perform this activity.

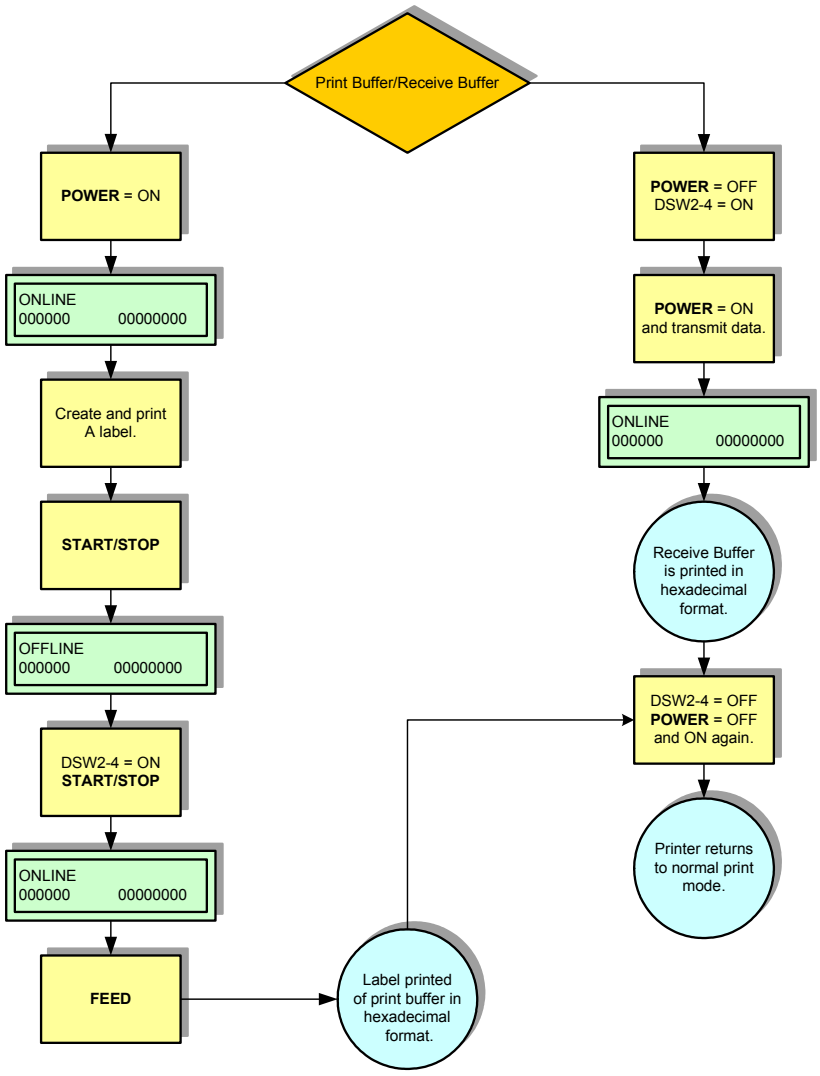


Figure 5-3, Hex Dump Mode

TEST LABEL PRINTING

The test label is designed to assist in the identification of print problems. Follow the flow chart provided below to perform this activity.

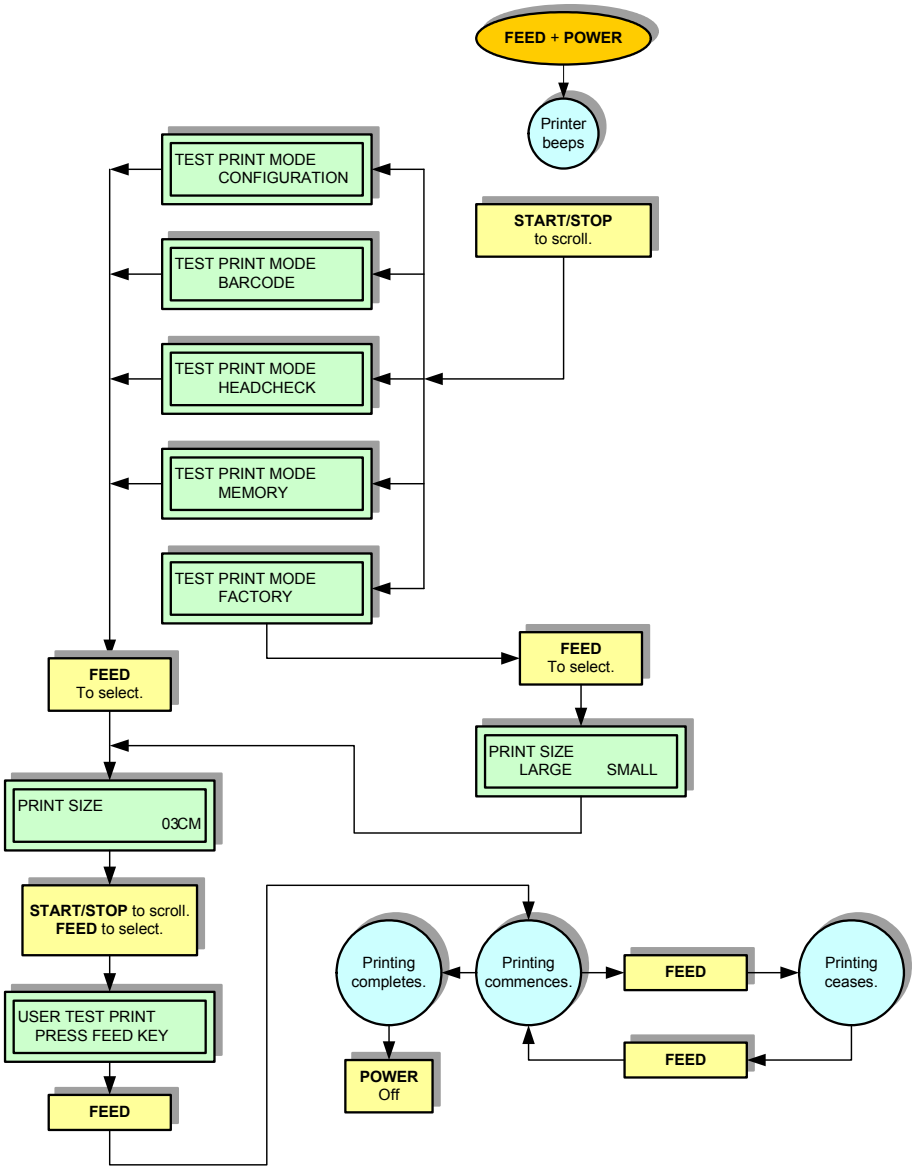


Figure 5-4, Test Print Mode

NOTE: The only print problem that the following sample test label does not display is fading of print image from one side of the label to the other. This is the result of improper print head balance.

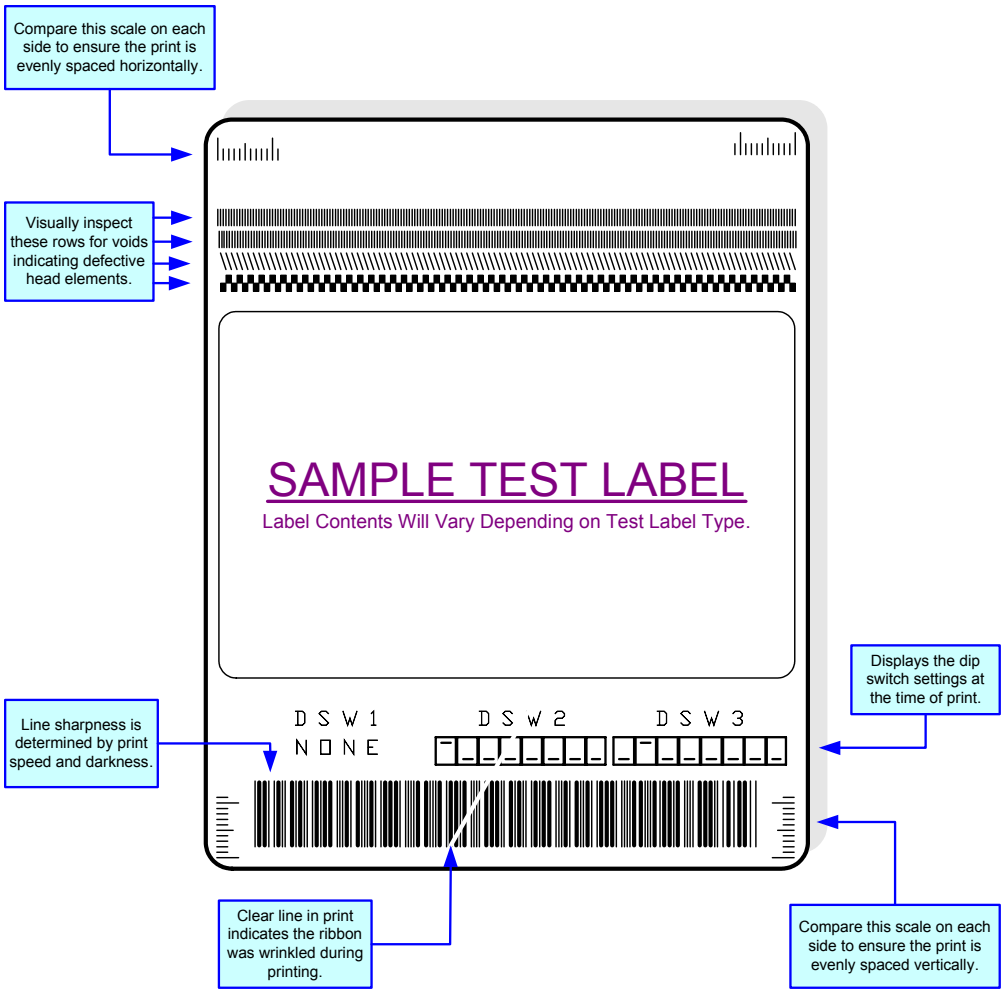
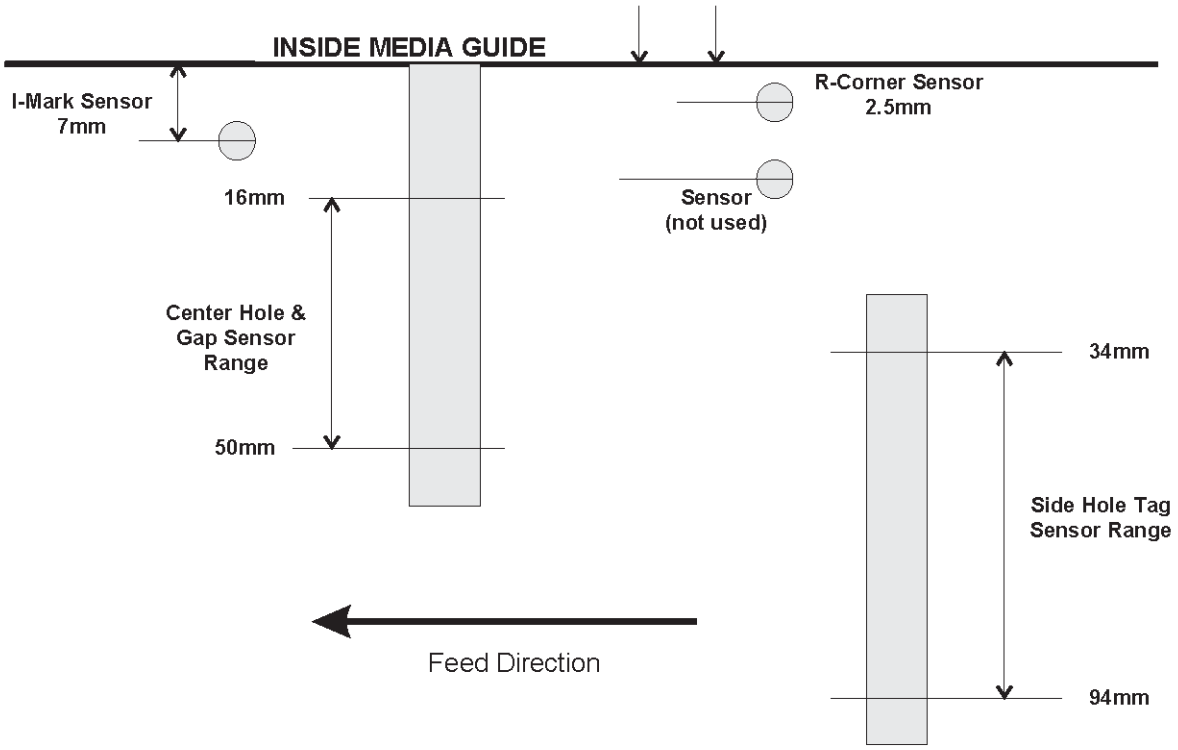

Compare this scale on each side to ensure the print is evenly spaced horizontally.
Visually inspect these rows for voids indicating defective head elements.
SAMPLE TEST LABEL
Label Contents Will Vary Depending on Test Label Type.
Displays the dip switch settings at the time of print.
Line sharpness is determined by print speed and darkness.
D S W 1
N O N E
D S W 2
D S W 3
Clear line in print indicates the ribbon was wrinkled during printing.
Compare this scale on each side to ensure the print is evenly spaced vertically.

Figure 5-5, Sample Test Label

SENSOR LOCATIONS

This chapter provides a diagram identifying the locations of the printer's various sensors. Refer to the diagram provided below.



Sensor Positions Relative to Inside Media Guide

Figure 5-6, Sensor Locations

6

MAINTENANCE

- **Cleaning Procedures**
- **Replacement Procedures**
- **Adjustment Procedures**

CLEANING PROCEDURES

Cleaning of the printer is a necessary maintenance activity to ensure print quality and long printer life. There are two basic types of cleaning involved; the removal of loose debris and the removal of residue.

Use a soft cloth and/or a pneumatic blower to remove debris from the printer. This process should be performed prior to the removal of residue. To remove residue, apply SATO Solvent or isopropyl alcohol to a clean cotton swab and gently wipe the entire surface of the print head, each roller, and each sensor lens until clean.

It is recommended that the printer be cleaned after the printing of every two rolls of labels.

WARNING: DISCONNECT POWER SUPPLY TO THE PRINTER AND ALLOW TO COOL TO ROOM TEMPERATURE PRIOR TO CLEANING.

WARNING: EXCERSIZE CARE WHEN CLEANING TO PREVENT PERSONAL INJURY.

CAUTION: IF USING A PNEUMATIC BLOWER TO REMOVE DEBRIS FROM THE PRINTER, EXcERSIZE CARE TO PREVENT PRINT HEAD DAMAGE.

A cleaning sheet is provided with the printer for cleaning the print head. Place the sheet under the print head with its dull side oriented upward and protruding from the printer sufficiently enough to grasp. Close the print head and slowly pull the cleaning sheet out of the printer.

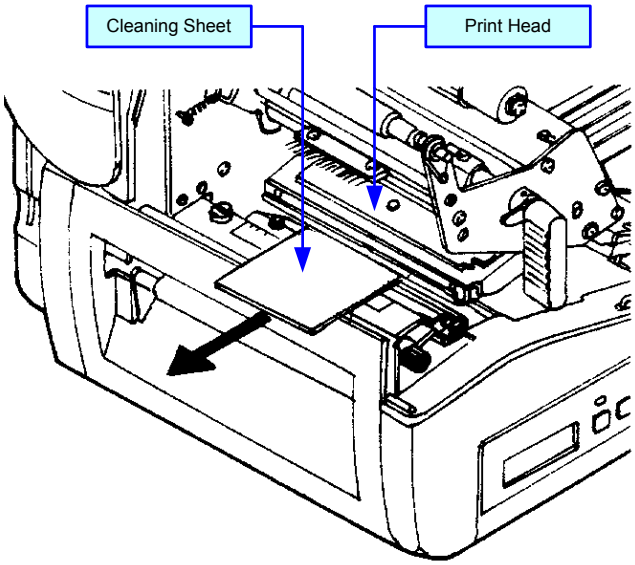


Figure 6-1, Cleaning Sheet Usage

REPLACEMENT PROCEDURES

The printer contains replaceable components and sub-assemblies. This chapter contains step-by-step instructions for the removal and replacement of those primary components and sub-assemblies that are subject to wear or damage.

FUSE REPLACEMENT

The printer has three fuses; one is externally accessible and is wired to the power supply while the other two are located internally and directly connected to the main circuit board. Only the externally accessible fuse is aproved for operator performed replacement.

To replace the externally accessible fuse, switch off the printer, disconnect the power supply cord, and unscrew fuse cap from the fuse connector located on the printer's back side. Withdraw the cap along with the fuse and inspect for damage. Insert replacement fuse into the cap and screw into the fuse connector. Restore power.

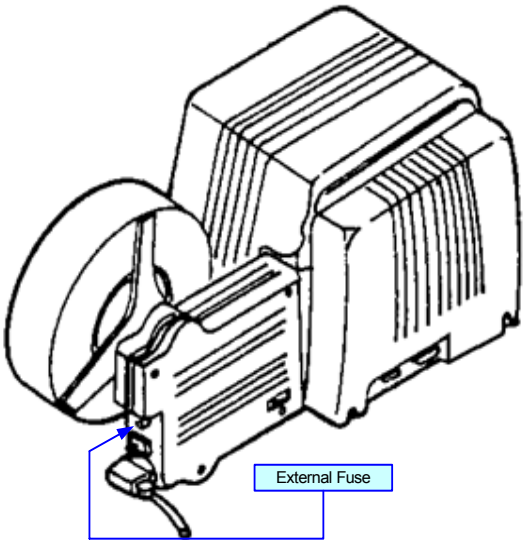


Figure 6-2, Fuse Replacement

PRINT HEAD REPLACEMENT

If the print head becomes damaged or wears out, it can be easily replaecd using a screwdriver. Critical adjustments are not required because the print head is a subassembly mounted to a permanent, factory adjusted mechanism.

1 Switch off the printer and disconnect the power supply cord.

2 Open the top housing cover

3 Unlatch the print head and remove the ribbon stock.

4 Relatch the print head and remove one mounting screw securing the defective print head.

5 Unlatch the print head and disconnect the two wiring harnesses from defective print head.

6 Connect the two wiring harnesses to the replacement print head.

7 Secure replacement print head to the print assembly using one mounting screw.

CAUTION: EXCERSIZE CARE WHEN INSTALLING THE REPLACEMENT PRINT HEAD TO PREVENT DAMAGE TO ITS ELEMENTS.

NOTE: A properly installed tear bar will be oriented so that it folds down in front of the print head andd is parallel with the print assembly.

8 Clear the print head counter. Refer to the relative procedure for instructions if required.

9 Reconnect power supply cord and reload ribbon stock.

10 Test cycle to ensure proper function and close the top housing cover.

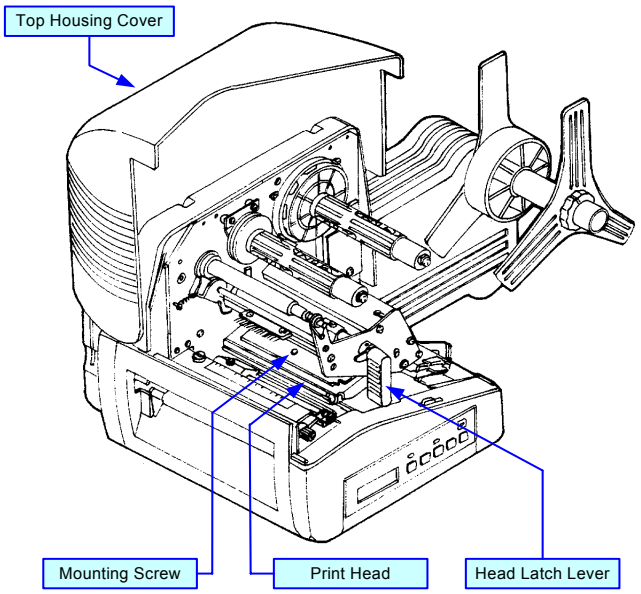


Figure 6-3, Print Head Replacement

RIBBON ROLLER REPLACEMENT

The ribbon roller is a high wear component due to the ribbon medium treading on its surface. The ribbon roller is the only roller approved for replacement by the operator. For all other roller replacements, contact a service representative.

> NOTE: Observe and remember the sequence and orientation of tribbon roller components as dismantling to facilitate installation of the replacement.

1 Switch off the printer and disconnect the power supply cord.
2 Remove the ribbon stock from the printer.
3 Remove the screw securing roller clamp to the frame.
4 Remove the roller clamp and lift away defective ribbon roller assembly.
5 Install the replacement ribbon roller assembly and apply clamp.
6 Secure the ribbon roller assembly and the clamp to the printer frame.
7 Reconnect power supply cord and test cycle.

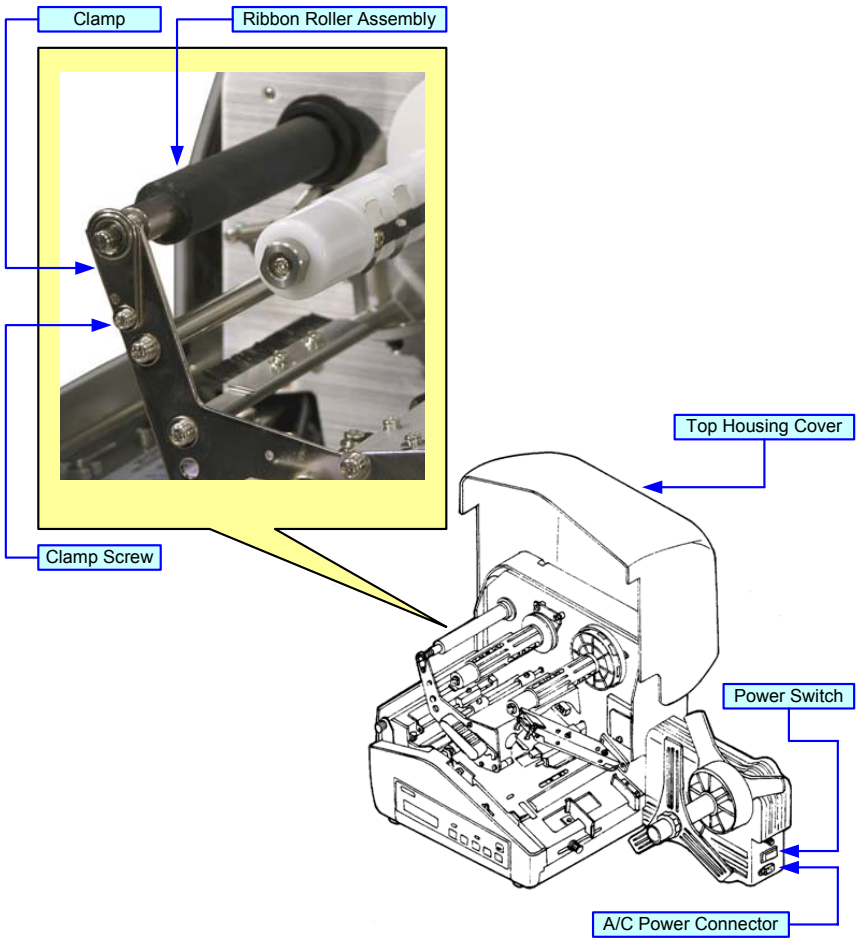


Figure 6-4, Ribbon Roller Replacement

ADJUSTMENT PROCEDURES

To maintain optimum performance and print quality, periodically mechanical adjustments will have to be made. These adjustments are typically required following the replacment of a component.

Other adjustments may be required due to variations in media size or quality and due to different print image denseness. Instructions relative to those conditions are not covered here. Refer to the Installation and Operation units for those relative instructions.

This chapter provides instructions on the performance of those activities that are mechanical in nature and are responsive to maintenance activities. The table below provides common print defects and their relative cause.

PRINT DEFECTS	RELATIVE PROCEDURE
Print becomes lighter or darker from one side to the other. This condition is repetitive from label to label.	Print Head Balance Adjustment
Voids in the overall print image that is repetitive from label to label.	Print Darkness Adjustment
A visible path on the label where print image is missing. The path will change somewhat from label to label.	Print Position Alignment Platen Roller Adjustment
The scales at the lower left and right sides are not equal distances from the labels lower edge.	Print Position Alignment
The lines are not sharp.	Print Darkness Adjustment
The image is too light or dark.	Print Darkness Adjustment
Bar code label has a sharp line where print is missing.	Print Darkness Adjustment
The printed position is too far in one direction or another.	Print Position Adjustment Offset Label Stop Position

PRINT HEAD BALANCE ADJUSTMENT

If the print head balance is out of adjustment, the printed image will be darker on side of the label than the other and the media stock will be proned to want to travel in the direction of least resistance.

The adjustment of print head pressure on the label is subjective. One will know when balance is achived by the disappearance of prevailing negative characteristics. To adjust print head balance, perform the following procedure.

1 Open the top housing cover to access the print assembly.

2 Begin the continuous printing of labels.

3 Slightly loosen the set screw and slightly adjust the adjustment screw until the negative characteristics are corrected.

4 Hold the adjustment screw in position while retightening the set screw.

5 Close the top housing cover to conceal print assembly.

> NOTE: There is a scale located above the set screw to facilitate proper adjustment.

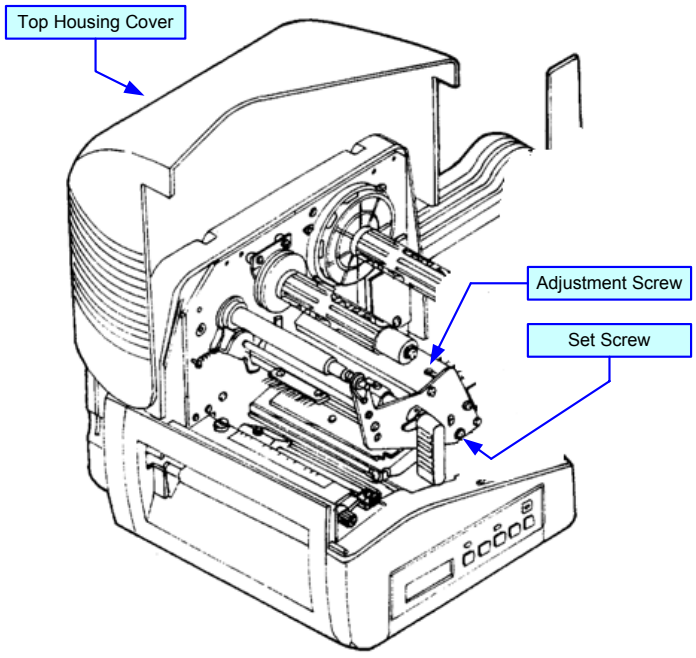


Figure 6-5, Print Head Balance Adjustment

PRINT HEAD ALIGNMENT

Print head position has a direct impact on print quality. An improperly aligned print head will cause the print to be inconsistent across the label. The following procedure will provide guidance on print head alignment.

1 Remove power and disconnect the power supply cord.

2 Open the top housing cover to access and open the print assembly.

3 Remove ribbon stock as applicable.

4 Loosen the two set screws and one mounting screw.

5 Manipulate the print head assembly so that it is parallel with platen roller.

6 Secure the mounting screw and two set screws.

7 Close the top housing cover and restore power.

> NOTE: There is a scale located on each end of the print head mounting plate. Use those scales to facilitate proper adjustment.

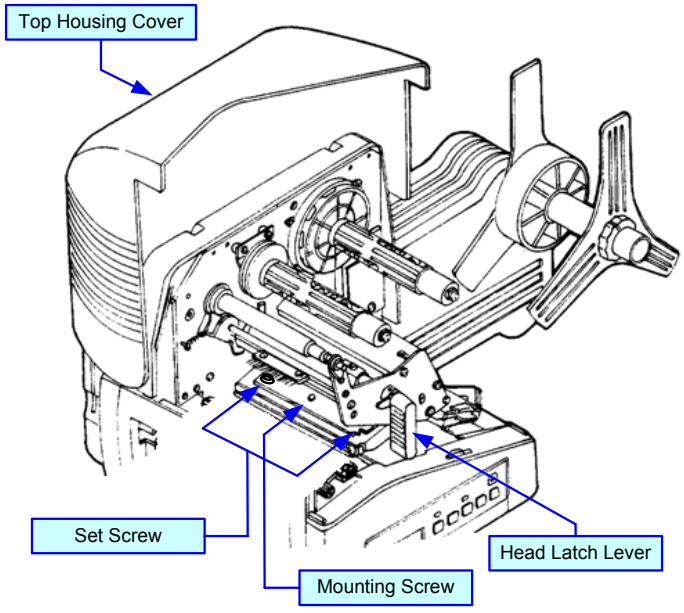


Figure 6-6, Print Head Alignment

PRESSURE ROLLER ALIGNMENT

The pressure roller works in conjunction with the feed roller, sandwiching the loaded media between the two. It is the drive-coupled feed roller that advances the media forward to the platen roller. The pressure roller is an idle one.

For proper media tracking the two rollers must be parallel and possess proportionate pressure from one end to the other. Tracking is the direction the media is incline to take. When the rollers are properly adjusted, the media will tavel straight forward without inclination to laterally deviate.

When there exists uneven pressure between the two rollers on either end, the media will attempt to take the route of least resistance. In doing so, will either track to the left or to the right. This condition is refered to as “wandering”.

Whereas this procedure covers only pressure roller alignment, it will most likely be used in conjunction with the Pressure Roller Balance procedure that follows.

If this procedure fails, or adjustment is extreme to remedy the tracking problem, recenter the pressure roller as indicated on its respective scale and perform the Pressure Roller Balance procedure. Return to this procedure for fine tuning as necessity dictates.

1 Open the top housing cover to access the pressure roller assembly.
2 Begin continuously printing labels.
3 Loosen the set screw and adjust the eccentric nut while observing the media tracking.
4 Hold the eccentric nut in position and tighten the set screw upon proper tracking.
5 Close the top housing cover.

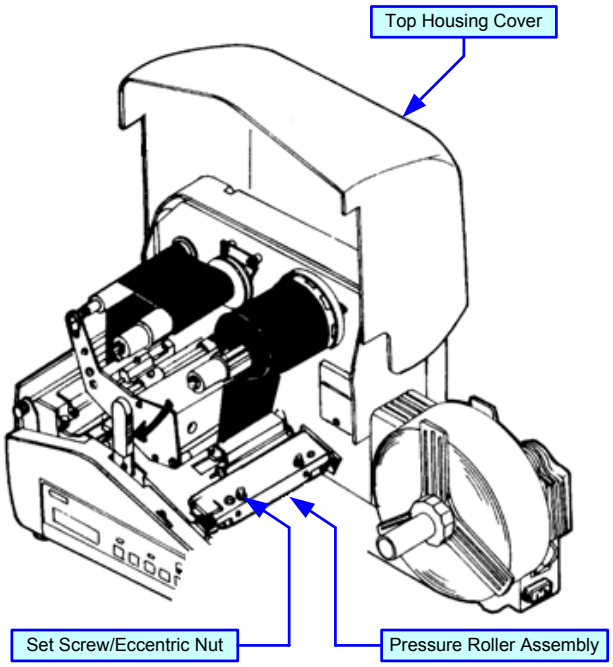


Figure 6-7, Pressure Roller Alignment

PRESSURE ROLLER BALANCE

The pressure roller works in conjunction with the feed roller, sandwiching the loaded media between the two. It is the drive-coupled feed roller that advances the media forward to the platen roller. The pressure roller is an idle one.

For proper media tracking the two rollers must be perfectly parallel and possess proportionate pressure from one end to the other. Tracking is the direction the media is inclined to take. When the rollers are evenly pressured, the media will tavel straight forward without deviating laterally.

When there exists uneven pressure between the two rollers on either end, the media will attempt to take the route of least resistance. In doing so, will either track to the left or to the right. This condition is refered to as “wandering”.

Whereas this procedure covers only pressure roller balance, it will most likely be used in conjunction with the Pressure Roller Alignment procedure that preceded this one.

If the performance of this procedure fails, or adjustment is extreme to remedy the tracking problem, adjust the two balance set screws evenly at about 5mm and perform the Pressure Roller Alignment procedure. Return to this procedure for fine tuning as necessity dictates.

1 Open the top housing cover to access the pressure roller assembly.
2 Begin continuously printing labels.
3 Loosen the lock nut on the end that the media is attempting to track toward.
4 Adjust the adjustment screw while observing the media tracking.
5 Hold the adjustment screw in position and tighten the lock nut upon proper tracking.

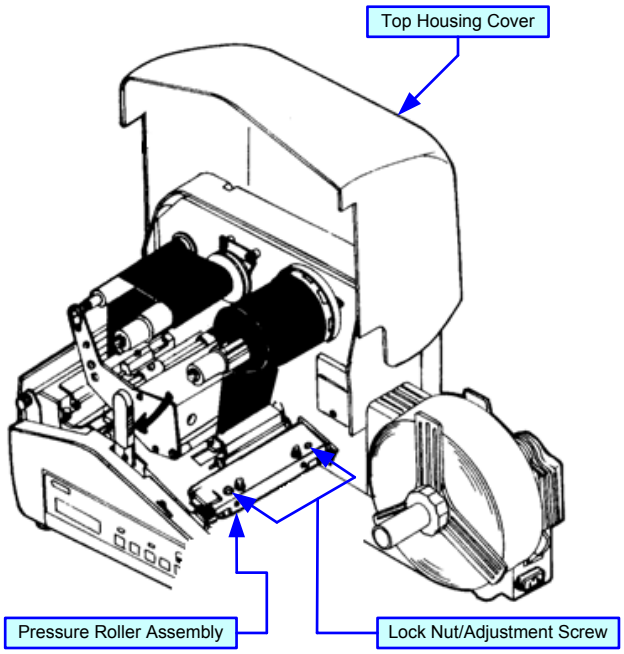


Figure 6-8, Pressure Roller Balance

RIBBON GUIDE ADJUSTMENT

If the print ribbon is not spread smoothly over the print head when it makes contact with the media, print voids will occur at the point of the ribbon fold. Typically, this is the result of the axis of one of the following not being perfectly parallel: ribbon spindle, ribbon roller, print head, or ribbon guide.

The purpose of the adjustable ribbon guide is to compensate for the axis deviations of the other three. By adjusting the ribbon guide proportionally to the degree of deviation, the ribbon spreads smoothly as it travels from the ribbon supply spindle, to the guide, and beyond.

Ribbon guide adjustment is a trial and error activity that requires the pause of printing, unlatching of the print head, adjusting the guide, relatching the print head, and printing once again. Several labels or tags must be printed following each adjustment to determine if the adjustment was effective.

The ribbon guide is secured to the face of the print assembly by a screw on each end. Before adjusting the guide, visually inspect that its axis is parallel with that of the print assembly. If not, adjust accordingly, ensure the set screws are secure, and once again commence printing.

By starting in a neutral position, either end may be adjusted vertically as necessary to remedy the wrinkling problem.

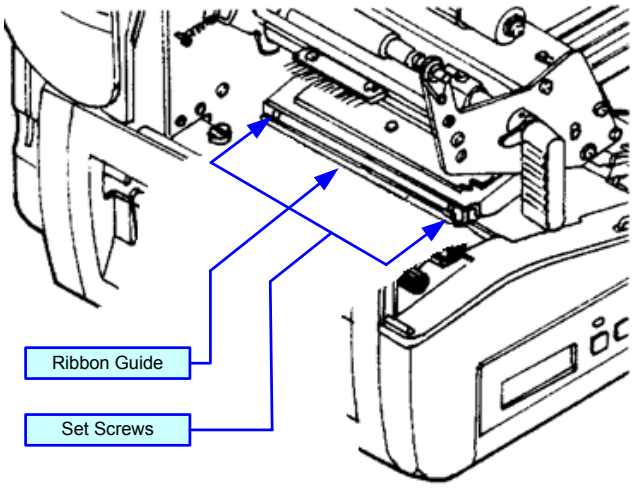


Figure 6-9, Ribbon Guide Adjustment

RIBBON SPINDLE TENSIONING

The printer has two ribbon spindles; one to supply ribbon medium from the rear of the printer past the print head to the spindle closest to the front for the purpose of rewinding the used medium. The rewind spindle is coupled to the drive train and draws the ribbon medium forward incrementally with the print media (label/tag) comparable with gearing ratios.

For proper function, the spindles must be individually adjusted with the correct drag. Drag is the resistance to the advancement of the meduim and is controlled by increasing or decreasing frictional tension to rotational movement. A torsion spring takes up excess slack in the ribbon medium during backfeed movement of the print media.

The following procedure explains how to adjust the ribbon spindles without the use of a tension gage. The procedure is the same for both, however, the tension requirements are different.

> NOTE: The tension reuirements for the supply spindle is 400-500 grams and 500-700 grams for the rewind spindle should a tension gage be available.

To tension adjust the ribbon spindles without the use of a tension gage, perform the following.

1. Open the top housing cover to access the ribbon spindle assemblies.
2. Loosen the set screw while holding the adjustment nut stationary.
3. Turn the adjustment nut in a manner to achieve the required space between the ribbon boss and the stopper collar. (3.5 to 3.0mm supply spindle, 3.0 to 2.0mm rewind spindle)
4. Hold the adjustment nut in position and secure the set screw.
5. Repeat steps 2 through 4 for the remaining spindle.

> NOTE: A complete revolution of the adjustment nut equals approximately 1mm (100g). Likewise, a half revolution equals .5mm (50g).

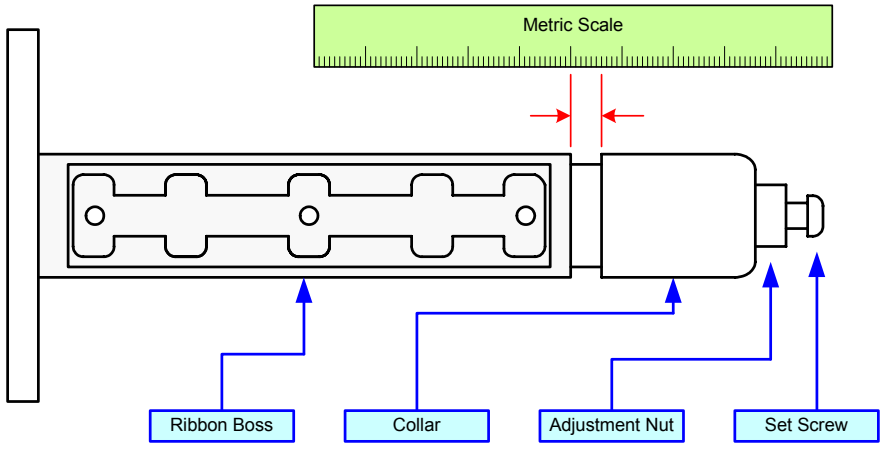


Figure 6-10, Ribbon Spindle Tensioning

PITCH SENSOR ADJUSTMENT (LABEL GAP & CENTER HOLE MEDIA)

This sensor adjustment regulates penetrating ability for media referencing. Penetration modification is performed via two potentiometers that is part of the potentiometer complex located behind the access panel on the left side of the printer.

To establish penetration, upper and lower voltage levels must be set and the difference between the two voltage levels should be maximized for optimum performance.

These activities require the use of a multimeter and may be perfomed with or without the assistance of the SATO Test Module. The test module is a purchase option sold by SATO America.

Refer to the procedure below for directions using the test module and Figure 6-11 for visual assistance.

1 Detach the access panel located on the left side of the printer.
2 Adjust the VR1 potentiometer fully counter clock-wise and the VR9 adjusted center scale.
3 Connect the test module to the available test connector.
4 Connect the multimeter ground probe to the pin identified as GRD on the test module.
5 Connect the multimeter positive probe to the pin identified as SIG.
6 Turn the printer on and rotate the test module dial to the 5 position.
7 Physically place the media's reference point over the pitch sensor.
8 Adjust the VR1 potentiometer until the multimeter displays a value less than +0.5V.
9 Relocate the media so the paper portion is oriented over the pitch sensor.
10 Regard the multimeter to determine the second measurement is greater than +1.5V.
11 Use the VR9 potentiometer for fine adjustment as necessary.
12 Repeat steps 6 through 11 until the required difference of 1.0V is achieved.
13 Begin normal printing to ensure proper adjustment.

Multimeter Alone

Sensor adjustment may be performed by using a multimeter without the assistance of the test module. To perform this task the multimeter probes must be attached to the correct connector pins of the test connector. Connect the multimeter positive probe to pin 1A and the negative probe to pin 2B. Refer to Figures 6-11 and 6-12 for visual assistance.

GAP & CENTER HOLE REFERENCE CHART				
MEDIA	**POTENTIOMETER**	**DIAL**	**CONNECTOR PIN**	**VOLT VALUE**
Label Gap	Course: VR1 Fine: VR9	5	Positive Probe: 1A Negative Probe: 2B	> +0.5V < +1.5V
Center Hole				

PITCH SENSOR ADJUSTMENT (EYE-MARK MEDIA)

This sensor adjustment regulates penetrating ability for media referencing. Penetration modification is performed via two potentiometers that is part of the potentiometer complex located behind the access panel on the left side of the printer.

To establish penetration, upper and lower voltage levels must be set and the difference between the two voltage levels should be maximized for optimum performance.

These activities require the use of a multimeter and may be perfomed with or without the assistance of the SATO Test Module. The test module is a purchase option..

Refer to the procedure below for directions using the test module and Figure 6-11 for visual assistance.

1 Detach the access panel located on the left side of the printer.
2 Adjust the VR8 potentiometer fully counter clock-wise and the VR2 adjusted center scale.
3 Connect the test module to the available test connector.
4 Connect the multimeter ground probe to the pin identified as GRD on the test module.
5 Connect the multimeter positive probe to the pin identified as SIG.
6 Turn the printer on and rotate the test module dial to the 4 position.
7 Physically place the media's reference point over the pitch sensor.
8 Adjust the VR8 potentiometer until the multimeter displays a value less than +0.5V.
9 Relocate the media so the paper portion is oriented over the pitch sensor.
10 Regard the multimeter to determine the second measurement is greater than +1.5V.
11 Use the VR8 potentiometer for fine adjustment as necessary.
12 Repeat steps 6 through 11 until the required difference of 0.9V is achieved.
13 Begin normal printing to ensure proper adjustment.

Multimeter Alone

Sensor adjustment may be performed by using a multimeter without the assistance of the test module. To perform this task the multimeter probes must be attached to the correct connector pins of the test connector. Connect the multimeter positive probe to pin 1A and the negative probe to pin 2B. Refer to Figures 6-11 and 6-12 for visual assistance.

EYE-MARK REFERENCE CHART				
MEDIA	**POTENTIOMETER**	**DIAL**	**TEST PINS**	**VOLT VALUE**
Eye-Mark Label	Course: VR2 Fine: VR8	5	Positive Probe: 1A Negative Probe: 1B	> +0.5V < +1.5V
Eye-Mark Tag				

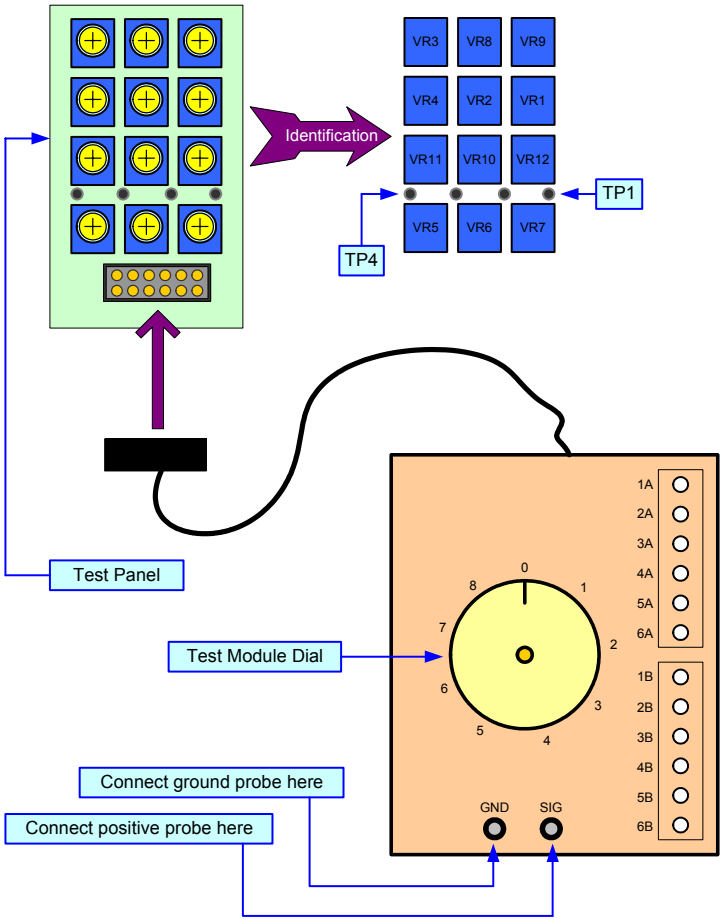


Figure 6-11, Test Module & Sensor Potentiometers

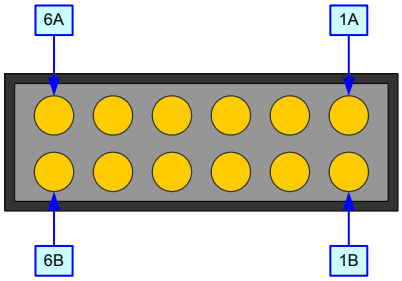


Figure 6-12, Test Connector

PITCH SENSOR ADJUSTMENT (R-CORNER MEDIA)

This sensor adjustment regulates penetrating ability for media referencing. Penetration modification is performed via two potentiometers that is part of the potentiometer complex located behind the access panel on the left side of the printer.

To establish penetration, upper and lower voltage levels must be set and the difference between the two voltage levels should be maximized for optimum performance.

These activities require the use of a multimeter and may be perfomed with or without the assistance of the SATO Test Module. The test module is a purchase option.

Perform the steps below using the test module and Figure 6-11 for visual assistance.

1 Detach the access panel located on the left side of the printer.
2 Adjust the VR6 and VR10 potentiometers fully counter clock-wise.
3 Connect the test module to the available test connector.
4 Connect the multimeter ground probe to the pin identified as GRD on the test module.
5 Connect the multimeter positive probe to the pin identified as SIG.
6 Turn the printer on and rotate the test module dial to the 8 position.
7 Physically place the media's reference point over the pitch sensor.
8 Adjust the VR6 potentiometer until the multimeter displays a value less than +0.5V.
9 Relocate the media so the paper portion is oriented over the pitch sensor.
10 Regard the multimeter to determine the second measurement is greater than +2.0V.
11 Repeat steps 6 through 11 until the required difference of 1.0V is achieved.
12 Connect the multimeter positive probe to TP2 connector and the negative probe to TP4.
13 Adjust the VR10 potentiometer so the multimeter display indicates a nominal voltage value.

> NOTE: The VR10 potentiometer establishes the threshold value and the nominal value is midway between the lower and upper values.

14 Begin normal printing to ensure proper adjustment.

Multimeter Alone

Sensor adjustment may be performed by using a multimeter without the assistance of the test module. To perform this task the multimeter probes must be attached to the correct connector pins of the test connector. Connect the multimeter positive probe to pin 1A and the negative probe to pin 5B. Refer to Figures 6-11 and 6-12 for visual assistance.

R-CORNER PEFERENCE CHART				
MEDIA	**POTENTIOMETER**	**DIAL**	**TEST PINS**	**VOLT VALUE**
R-Corner	Sensor: VR6 Threshold: VR10	8	Positive Probe: 1A, TP2 Negative Probe: 5B, TP4	> +0.5V < +2.0V

PITCH SENSOR ADJUSTMENT (SIDE HOLE MEDIA)

This sensor adjustment regulates penetrating ability for media referencing. Penetration modification is performed via two potentiometers that is part of the potentiometer complex located behind the access panel on the left side of the printer.

To establish penetration, upper and lower voltage levels must be set and the difference between the two voltage levels should be maximized for optimum performance.

These activities require the use of a multimeter and may be perfomed with or without the assistance of the SATO Test Module. The test module is a purchase option.

Perform the steps below using the test module and refer to Figure 6-11 for visual assistance.

1 Detach the access panel located on the left side of the printer.
2 Adjust the VR5 and VR12 potentiometers fully counter clock-wise.
3 Connect the test module to the available test connector.
4 Connect the multimeter ground probe to the pin identified as GRD on the test module.
5 Connect the multimeter positive probe to the pin identified as SIG.
6 Turn the printer on and rotate the test module dial to the 7 position.
7 Physically place the media's reference point over the pitch sensor.
8 Adjust the VR5 potentiometer until the multimeter displays a value less than +0.5V.
9 Relocate the media so the paper portion is oriented over the pitch sensor.
10 Regard the multimeter to determine the second measurement is greater than +2.0V.
11 Repeat steps 6 through 11 until a minimum difference of 1.5V is achieved.
12 Connect the multimeter positive probe to TP1 connector and the negative probe to TP4.
13 Adjust the VR12 potentiometer so the multimeter display indicates a nominal voltage value.

> NOTE: The VR12 potentiometer establishes the threshold value which is the nominal value (midway between the lower and upper values).

14 Begin normal printing to ensure proper adjustment.

Multimeter Alone

Sensor adjustment may be performed by using a multimeter without the assistance of the test module. To perform this task the multimeter probes must be attached to the correct connector pins of the test connector. Connect the multimeter positive probe to pin 1A and the negative probe to pin 4B. Refer to Figures 6-11 and 6-12 for visual assistance.

SIDE HOLE PEFERENCE CHART				
MEDIA	**POTENTIOMETER**	**DIAL**	**TEST PINS**	**VOLT VALUE**
Side Hole	Sensor: VR5 Threshold: VR12	8	Positive Probe: 1A, TP1 Negative Probe: 5B, TP4	> +0.5V < +2.0V

JUMP HOLE SENSOR ADJUSTMENT

This sensor adjustment regulates penetrating ability for media referencing. Penetration modification is performed via two potentiometers that is part of the potentiometer complex located behind the access panel on the left side of the printer.

To establish penetration, upper and lower voltage levels must be set and the difference between the two voltage levels should be maximized for optimum performance.

These activities require the use of a multimeter and may be perfomed with or without the assistance of the SATO Test Module. The test module is a purchase option.

Perform the steps below using the test module and refer to Figure 6-11 for visual assistance.

1 Detach the access panel located on the left side of the printer.
2 Adjust the VR7 and VR11 potentiometers fully counter clock-wise.
3 Connect the test module to the available test connector.
4 Connect the multimeter ground probe to the pin identified as GRD on the test module.
5 Connect the multimeter positive probe to the pin identified as SIG.
6 Turn the printer on and rotate the test module dial to the 7 position.
7 Physically place side hole media's reference point over the jump sensor.
8 Adjust the VR7 potentiometer until the multimeter displays a value less than +0.5V.
9 Relocate the media so the paper portion is oriented over the jump sensor.
10 Regard the multimeter to determine the second measurement is greater than +2.0V.
11 Repeat steps 6 through 10 until a minimum difference of 1.5V is achieved.
12 Connect the multimeter positive probe to TP3 connector and the negative probe to TP4.
13 Adjust the VR11 potentiometer so the multimeter display indicates a nominal voltage value.

> NOTE: The VR12 potentiometer establishes the threshold value which is the nominal value (midway between the lower and upper values).

14 Begin normal printing to ensure proper adjustment.

Multimeter Alone

Sensor adjustment may be performed by using a multimeter without the assistance of the test module. To perform this task the multimeter probes must be attached to the correct connector pins of the test connector. Connect the multimeter positive probe to pin 1A and the negative probe to pin 5B. Refer to Figures 6-11 and 6-12 for visual assistance.

JUMP SENSOR PEFERENCE CHART				
MEDIA	**POTENTIOMETER**	**DIAL**	**TEST PINS**	**VOLT VALUE**
Side Hole	Sensor: VR7 Threshold: VR11	8	Positive Probe: 1A, TP3 Negative Probe: 6B, TP4	> +0.5V < +2.0V

RIBBON SENSOR ADJUSTMENT

This sensor adjustment regulates penetrating ability for ribbon feed. Penetration modification is performed via a potentiometer that is part of the potentiometer complex located behind the access panel on the left side of the printer.

To establish the penetration level, upper and lower limits must be set. These activities require the use of a multimeter and may be perfomed with or without the assistance of the SATO Test Module. The test module is a purchase option sold by SATO America. Refer to the procedure below for directions using the test module.

> NOTE: Refer to the RIBBON REFERENCE CHART table above for the assigned potentiometer to be adjusted for to the media used. The table also identifies the relative test module dial setting and the lower and upper limit multimeter requirements.

1. Detach the access panel located on the left side of the printer.
2. Load the printer with ribbon stock.
3. Connect the test module to the available test connector.
4. Connect the multimeter ground probe to the pin identified as GRD on the test module.
5. Connect the multimeter positive probe to the pin identified as SIG
6. Turn the printer on and rotate the test module dial to the required position.
7. Rotate the ribbon supply spindle to align one of the slots with the sensor eye.
8. Adjust the relative potentiometer to the required multimeter reading.
9. Rotate the ribbon supply spindle to align one of the tabs with the sensor eye.
10. Regard the multimeter reading to determine the difference or upper limit.
11. Repeat steps 6 through 10 until the required difference is achieved.
12. Begin normal printing to ensure proper adjustment.

Multimeter Alone

Sensor adjustment may be performed by using a multimeter without the assistance of the test module. To perform this task the multimeter probes must be attached to the correct connector pins of the test connector. Refer to the table above to correlate the desired adjustment function with its relative connector pin. Refer to Figures 6-11 and 6-12 for guidance.

RIBBON REFERENCE CHART				
MEDIA	**POTENTIOMETER**	**DIAL**	**CONNECTOR PIN**	**MULTIMETER**
Ribbon Stock	VR3	6	Pos: 1A, Neg: 3B	Lower Limit: +0.5V Upper Limit: +2.0V

CUTTER SENSOR ADJUSTMENT

This sensor adjustment regulates penetrating ability for the cutter sensor. Penetration modification is performed via a potentiometer that is part of the cutter assembly. To establish the penetration level, upper and lower limits must be set. These activities require the use of a multimeter.

> NOTE: Refer to the CUTTER REFERENCE CHART table below for the assigned connector pins, the potentiometer to be adjusted, and the desired multimeter voltage values. The sensor switch must be in the proper position when setting the cutter sensor's penetrating sensitivity.

1 Load the printer with media and ribbon as applicable and power on.

2 Connect the multimeter ground probe to the pin identified as SG on the cutter sensor board.

3 Connect the multimeter positive probe to the relative pin on the cutter sensor board.

> NOTE: For tutorial purposes; the HO pin is for hole sensing, the IM pin is for eye-mark sensing, and the SG pin represents signal ground.

4 Physically place the media into the cutter assembly so the sensor is facing the printable media and record the multimeter reading.

5 Move the media so that the sensor is facing its reference mark and record the multimeter reading.

6 Adjust the relative potentiometer to the required multimeter reading.

7 Regard the multimeter display to determine the difference or upper limit.

8 Repeat steps 6 through 9 until the required difference is achieved.

9 Begin normal printing to ensure proper adjustment.

CUTTER REFERENCE CHART

MEDIA	POTENTIOMETER	SWITCH POS	CONNECTOR PIN	VOLT VALUE
Hole Media	VR1	leftward	SG / HO	Lower: >0.5 Upper: <2.5
Gap Media	VR1	leftward	SG / HO	Lower: >0.5 Upper: <2.5
Eye-Mark Media	VR2	leftward	SG / IM	Lower: >0.5 Upper: <4.0
Notched Media	VR3	rightward	SG / HO	Lower: >2.0 Upper: <7.0